NO. KAD PENGENALAN | | | | | | | - | | | - | | | | |

ANGKA GILIRAN | | | | | | | | | |

Nama ..... Tingkatan .....

Sekolah .....

MODUL PINTAS
TINGKATAN 5

3472/1

ADDITIONAL MATHEMATICS
Kertas 1

2 jam

Dua jam

JANGAN BUKA KERTAS PEPERIKSAAN INI SEHINGGA DIBERITAHU

1. *Tulis* **nombor kad pengenalan, angka giliran, nama, tingkatan** *dan* **sekolah** *anda pada petak yang disediakan.*
2. *Kertas peperiksaan ini adalah dalam dwibahasa.*
3. *Soalan dalam bahasa Inggeris mendahului soalan yang sepadan dalam bahasa Melayu.*
4. *Calon dibenarkan menjawab keseluruhan atau sebahagian soalan sama ada dalam bahasa Inggeris atau bahasa Melayu.*
5. *Calon dikehendaki membaca maklumat di halaman belakang kertas peperiksaan ini.*

Untuk Kegunaan Pemeriksa		
Kod Pemeriksa :		
Soalan	Markah Penuh	Markah Diperoleh
1	2	
2	3	
3	4	
4	4	
5	3	
6	4	
7	3	
8	2	
9	3	
10	3	
11	3	
12	3	
13	4	
14	3	
15	3	
16	3	
17	3	
18	4	
19	2	
20	3	
21	4	
22	4	
23	3	
24	3	
25	4	
Jumlah	80	

Kertas peperiksaan ini mengandungi 32 halaman bercetak.

The following formulae may be helpful in answering the questions. The symbols given are the ones commonly used.

Rumus-rumus berikut boleh membantu anda menjawab soalan. Simbol-simbol yang diberi adalah yang biasa digunakan.

ALGEBRA

1 $x = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

2 $a^m \times a^n = a^{m+n}$

3 $a^m \div a^n = a^{m-n}$

4 $(a^m)^n = a^{mn}$

5 $\log_a mn = \log_a m + \log_a n$

6 $\log_a \dfrac{m}{n} = \log_a m - \log_a n$

7 $\log_a m^n = n \log_a m$

8 $\log_a b = \dfrac{\log_c b}{\log_c a}$

9 $T_n = a + (n-1)d$

10 $S_n = \dfrac{n}{2}[2a + (n-1)d]$

11 $T_n = ar^{n-1}$

12 $S_n = \dfrac{a(r^n - 1)}{r-1} = \dfrac{a(1-r^n)}{1-r}, r \neq 1$

13 $S_\infty = \dfrac{a}{1-r}, |r| < 1$

CALCULUS
KALKULUS

1 $y = uv, \dfrac{dy}{dx} = u\dfrac{dv}{dx} + v\dfrac{du}{dx}$

2 $y = \dfrac{u}{v}, \dfrac{dy}{dx} = \dfrac{v\dfrac{du}{dx} - u\dfrac{dv}{dx}}{v^2}$

3 $\dfrac{dy}{dx} = \dfrac{dy}{du} \times \dfrac{du}{dx}$

4 Area under a curve
Luas di bawah lengkung

$= \int_a^b y \, dx$ or (*atau*)

$= \int_a^b x \, dy$

5 Volume of revolution
Isi padu kisaran

$= \int_a^b \pi y^2 \, dx$ or (*atau*)

$= \int_a^b \pi x^2 \, dy$

STATISTICS
STATISTIK

1 $\bar{x} = \dfrac{\sum x}{N}$

2 $\bar{x} = \dfrac{\sum fx}{\sum f}$

3 $\sigma = \sqrt{\dfrac{\sum (x-\bar{x})^2}{N}} = \sqrt{\dfrac{\sum x^2}{N} - \bar{x}^2}$

4 $\sigma = \sqrt{\dfrac{\sum f(x-\bar{x})^2}{\sum f}} = \sqrt{\dfrac{\sum fx^2}{\sum f} - \bar{x}^2}$

5 $m = L + \left(\dfrac{\frac{1}{2}N - F}{f_m}\right)C$

6 $I = \dfrac{Q_1}{Q_0} \times 100$

7 $\bar{I} = \dfrac{\sum W_i I_i}{\sum W_i}$

8 ${}^nP_r = \dfrac{n!}{(n-r)!}$

9 ${}^nC_r = \dfrac{n!}{(n-r)!r!}$

10 $P(A \cup B) = P(A) + P(B) - P(A \cap B)$

11 $P(X = r) = {}^nC_r p^r q^{n-r}$, $p + q = 1$

12 Mean / *Min* , $\mu = np$

13 $\sigma = \sqrt{npq}$

14 $Z = \dfrac{X - \mu}{\sigma}$

GEOMETRY
GEOMETRI

1 Distance / *Jarak*

$= \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

2 Midpoint / *Titik tengah*

$(x, y) = \left(\dfrac{x_1 + x_2}{2}, \dfrac{y_1 + y_2}{2}\right)$

3 A point dividing a segment of a line
Titik yang membahagi suatu tembereng garis

$(x, y) = \left(\dfrac{nx_1 + mx_2}{m+n}, \dfrac{ny_1 + my_2}{m+n}\right)$

4 Area of triangle / *Luas segi tiga*

$= \dfrac{1}{2}\left|(x_1y_2 + x_2y_3 + x_3y_1) - (x_2y_1 + x_3y_2 + x_1y_3)\right|$

5 $\left|\underline{\mathbf{r}}\right| = \sqrt{x^2 + y^2}$

6 $\hat{\mathbf{r}} = \dfrac{x\underline{\mathbf{i}} + y\underline{\mathbf{j}}}{\sqrt{x^2 + y^2}}$

TRIGONOMETRY
TRIGONOMETRI

1 Arc length, $s = r\theta$
Panjang lengkok, $s = j\theta$

2 Area of sector, $A = \frac{1}{2} r^2 \theta$
Luas sektor, $L = \frac{1}{2} j^2 \theta$

3 $\sin^2 A + \cos^2 A = 1$
$\sin^2 A + \text{kos}^2 A = 1$

4 $\sec^2 A = 1 + \tan^2 A$
$\text{sek}^2 A = 1 + \tan^2 A$

5 $\text{cosec}^2 A = 1 + \cot^2 A$
$\text{kosek}^2 A = 1 + \text{kot}^2 A$

6 $\sin 2A = 2 \sin A \cos A$
$\sin 2A = 2 \sin A \text{ kos } A$

7 $\cos 2A = \cos^2 A - \sin^2 A$
$= 2\cos^2 A - 1$
$= 1 - 2\sin^2 A$

$\text{kos } 2A = \text{kos}^2 A - \sin^2 A$
$= 2\,\text{kos}^2 A - 1$
$= 1 - 2\sin^2 A$

8 $\sin(A \pm B) = \sin A \cos B \pm \cos A \sin B$
$\sin(A \pm B) = \sin A \text{ kos } B \pm \text{kos } A \sin B$

9 $\cos(A \pm B) = \cos A \cos B \mp \sin A \sin B$
$\text{kos}(A \pm B) = \text{kos } A \text{ kos } B \mp \sin A \sin B$

10 $\tan(A \pm B) = \dfrac{\tan A \pm \tan B}{1 \mp \tan A \tan B}$

11 $\tan 2A = \dfrac{2\tan A}{1 - \tan^2 A}$

12 $\dfrac{a}{\sin A} = \dfrac{b}{\sin B} = \dfrac{c}{\sin C}$

13 $a^2 = b^2 + c^2 - 2bc \cos A$
$a^2 = b^2 + c^2 - 2bc \text{ kos } A$

14 Area of triangle / *Luas segi tiga*
$= \frac{1}{2} ab \sin C$

For Examiner's Use

Answer **all** questions.
Jawab **semua** *soalan.*

1 Diagram 1 shows the linear function f.
Rajah 1 *menunjukkan fungsi linear* f.

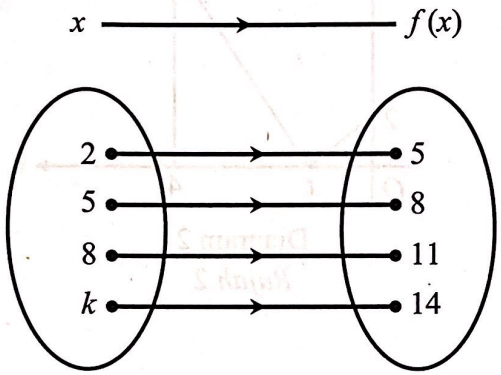


Diagram 1
Rajah 1

(*a*) State the value of k.
Nyatakan nilai k.

(*b*) Using the function notation, express f in terms of x.
Menggunakan tatatanda fungsi, ungkapkan f *dalam sebutan* x.

[2 *marks*]
[2 *markah*]

Answer / *Jawapan*:

(*a*)

(*b*)

1
2

2 Diagram 2 shows the graph of the function $f(x) = |3x - 2|$, for the domain $0 \leq x \leq 4$.
Rajah 2 menunjukkan graf bagi fungsi $f(x) = |3x - 2|$, *untuk domain* $0 \leq x \leq 4$.

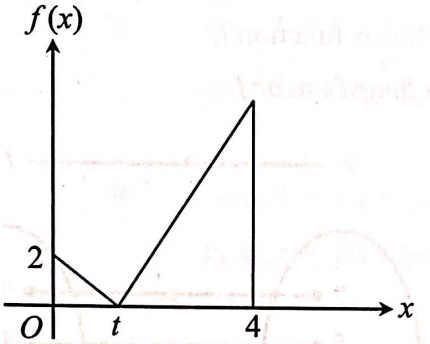


Diagram 2
Rajah 2

State
Nyatakan

(*a*) the value of *t*,
nilai t,

(*b*) the range of $f(x)$ corresponding to the given domain.
julat $f(x)$ *berdasarkan domain yang diberi.*

[3 *marks*]
[3 *markah*]

Answer / *Jawapan*:

(*a*)

(*b*)

2
3

For Examiner's Use

3 It is given that 3 and p are the roots of the quadratic equation $(2x - 1)(x + 3) = k(x - 1)$, where p and k are constants.

Find the value of p and of k. [4 *marks*]

Diberi bahawa 3 *dan* p *adalah punca-punca bagi persamaan kuadratik* $(2x - 1)(x + 3) = k(x - 1)$, *dengan keadaan p dan k ialah pemalar.*

Cari nilai p dan nilai k. [4 *markah*]

Answer / *Jawapan*:

3

4

4 Diagram 4 shows the graph of a quadratic function $y = -m(x - n)^2 + 3$, where m and n are constants.

Rajah 4 menunjukkan graf fungsi kuadratik $y = -m(x - n)^2 + 3$, *dengan keadaan* m *dan* n *ialah pemalar.*

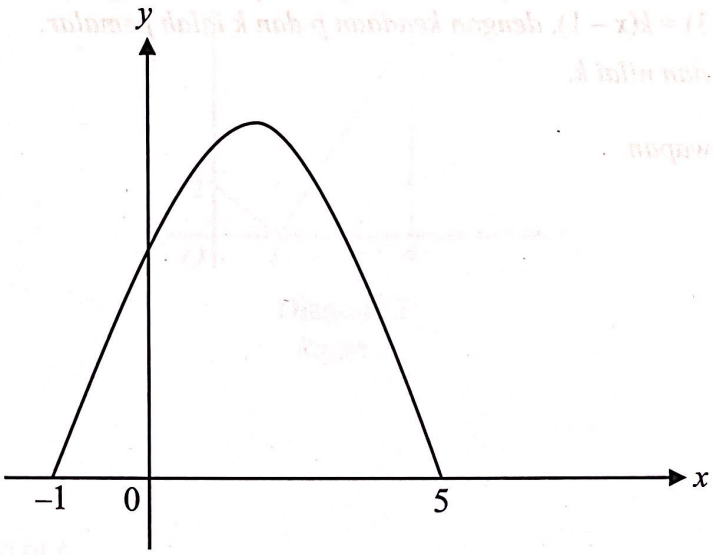


Diagram 4
Rajah 4

Find

Cari

(*a*) the value of m and of n,
nilai m dan nilai n,

(*b*) the coordinates of the maximum point of the curve,
koordinat titik maksimum bagi lengkung itu,

(*c*) the equation of the axis of symmetry of the curve.
persamaan paksi simetri bagi lengkung itu.

[4 *marks*]
[4 *markah*]

For Examiner's Use

Answer / *Jawapan*:

(*a*)

(*b*)

(*c*)

4

4

5 If $f(x) = x^2 + px + 1$ is always positive for all real values of x, find the range of values of p. [3 *marks*]

Jika $f(x) = x^2 + px + 1$ *sentiasa positif untuk semua nilai nyata bagi* x, *cari julat bagi nilai-nilai* p. [3 *markah*]

Answer / *Jawapan*:

5

3

For Examiner's Use

6 Given $\log_2 Y = a$ and $\log_2 X = b$, express in terms of a and/or b

Diberi $\log_2 Y = a$ *dan* $\log_2 X = b$, *ungkapkan dalam sebutan a dan/atau b*

(*a*) $\log_2 (XY^3)$

(*b*) $\log_8 Y$

[4 *marks*]
[4 *markah*]

Answer / *Jawapan*:

(*a*)

(*b*)

6

4

7 Given $4(2^{n-1}) = 16^n$, find the value of n. [3 *marks*]

Diberi $4(2^{n-1}) = 16^n$, *cari nilai* n. [3 *markah*]

Answer / *Jawapan*:

7

3

For Examiner's Use

8 Given the equation of straight line of PQ is $3x - y + 9 = 0$ and coordinates of point Q is $(-2, 3)$.

Find the equation of straight line QR which is $\angle PQR$ is a right angle. [2 *marks*]

Diberi persamaan garis lurus PQ ialah $3x - y + 9 = 0$ *dan koordinat titik Q ialah* $(-2, 3)$.

Cari persamaan garis lurus QR di mana $\angle PQR$ *bersudut tegak.* [2 *markah*]

Answer / *Jawapan*:

8

2

9 A straight line passes through $A(4, 2)$ and $B(13, 8)$. Point C divides the line segment AB such that $2AB = 3AC$.

Find the coordinates of point C. [3 *marks*]

Satu garis lurus melalui $A(4, 2)$ *dan* $B(13, 8)$. *Titik C membahagikan tembereng garis AB dengan keadaan* $2AB = 3AC$.

Cari koordinat titik C. [3 *markah*]

Answer / *Jawapan*:

9

3

For Examiner's Use

10 A set of data consists of seven integers. The sum of numbers is 35 and the standard deviation is 4. When integer, x, is added to the original set of data, the mean is unchanged.

Satu set data terdiri daripada tujuh integer. Hasil tambah bagi nombor-nombor itu ialah 35 dan sisihan piawai ialah 4. Apabila integer, x, dimasukkan ke dalam set data asal itu, didapati min tidak berubah.

Find

Cari

(*a*) value of x,

nilai x,

(*b*) the standard deviation of the new set of data.

sisihan piawai bagi set data yang baharu itu.

[3 *marks*]
[3 *markah*]

Answer / *Jawapan*:

(*a*)

(*b*)

10

3

11 A set of data consists of 8 numbers. The sum of the numbers is 120 and the sum of the square of the numbers is 2 100.

Suatu set data terdiri daripada 8 *nombor. Hasil tambah bagi nombor-nombor itu ialah* 120 *dan hasil tambah kuasa dua bagi nombor-nombor itu ialah* 2 100.

Find, for the 8 numbers,

Cari, bagi 8 *nombor itu,*

(*a*) the mean,

min,

(*b*) the variance.

varians.

[3 *marks*]
[3 *markah*]

Answer / *Jawapan*:

(*a*)

(*b*)

11

3

For Examiner's Use

12 Diagram 12 shows a circle with centre O and radius 8 cm.

Rajah 12 *menunjukkan sebuah bulatan dengan pusat O dan jejari* 8 cm.

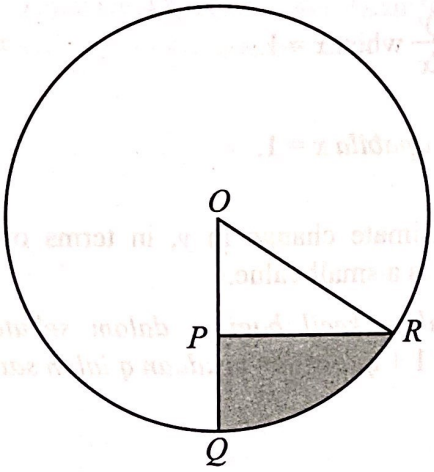


Diagram 12
Rajah 12

[Use / *Guna* $\pi = 3{\cdot}142$]

Given P, Q and R are points where $OP = PQ$ and $\angle OPR = 90°$.
Find the area, in cm², of the shaded region. [3 *marks*]

Diberi P, Q dan R adalah titik dengan keadaan $OP = PQ$ *dan* $\angle OPR = 90°$.
Cari luas, dalam cm², *kawasan berlorek.* [3 *markah*]

Answer / *Jawapan*:

12

3

13 Given $y = 5x^2 + 2x - 3$,

Diberi $y = 5x^2 + 2x - 3$,

(*a*) find the value of $\frac{dy}{dx}$ when $x = 1$.

cari nilai bagi $\frac{dy}{dx}$ *apabila* $x = 1$.

(*b*) express the approximate change in y, in terms of q, when x changes from 1 to $1 + q$, where q is a small value.

ungkapkan perubahan kecil bagi y, dalam sebutan q, apabila x berubah daripada 1 *kepada* $1 + q$, *dengan keadaan q ialah satu nilai yang kecil.*

[4 *marks*]
[4 *markah*]

Answer / *Jawapan*:

(*a*)

(*b*)

13

4

For Examiner's Use

14 For the arithmetic progression 10, 13, 16, …, state three consecutive terms in the progression with the sum is 138. [3 *marks*]

Untuk suatu janjang aritmetik 10, 13, 16, …, *nyatakan tiga sebutan yang berturutan dalam janjang ini yang hasil tambahnya ialah* 138. [3 *markah*]

Answer / *Jawapan*:

14

3

15 The first three terms of a geometric progression are 18, 12, $\frac{24}{3}$.

Find the sum to infinity of the progression. [3 *marks*]

Tiga sebutan pertama suatu janjang geometri ialah 18, 12, $\frac{24}{3}$.

Cari hasil tambah hingga sebutan ketakterhinggaan bagi janjang itu. [3 *markah*]

Answer / *Jawapan*:

15

3

For Examiner's Use

16 The first three terms of an arithmetic progression are 54, 51 and 48. The n^{th} term of this progression is negative.

Find the least value of n. [3 *marks*]

Tiga sebutan pertama bagi suatu janjang aritmetik ialah 54, 51 *dan* 48. *Sebutan ke-n bagi janjang ini adalah negatif.*

Cari nilai n yang terkecil. [3 *markah*]

Answer / *Jawapan*:

16

3

17 Diagram 17 shows the graph $\frac{1}{y}$ against $\frac{1}{x}$.

Rajah 17 *menunjukkan graf* $\frac{1}{y}$ *melawan* $\frac{1}{x}$.

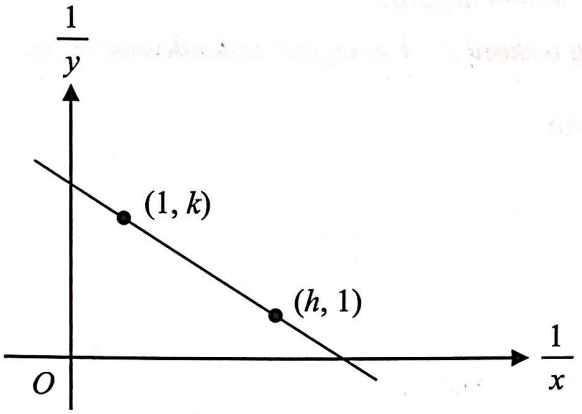


Diagram 17
Rajah 17

Given $3x + 2y = 11xy$, find the value of h and of k. [3 *marks*]

Diberi $3x + 2y = 11xy$, *cari nilai h dan nilai k.* [3 *markah*]

Answer / *Jawapan*:

17

3

For Examiner's Use

18 The gradient function of a curve is $\frac{dy}{dx} = kx - 18$, where k is a constant.

It is given that the curve has a turning point at (2, 3).

Fungsi kecerunan suatu lengkung ialah $\frac{dy}{dx} = kx - 18$, *dengan keadaan k ialah pemalar.*

Diberi bahawa lengkung itu mempunyai titik pusingan pada (2, 3).

Find

Cari

(*a*) the value of k,

nilai k,

(*b*) the equation of the curve.

persamaan lengkung itu.

[4 *marks*]
[4 *markah*]

Answer / *Jawapan*:

(*a*)

(*b*)

18

4

19 The vectors $\underline{a}$ and $\underline{b}$ are non-zero parallel.
It is given that $(m + 2)\,\underline{a} = (n - 4)\,\underline{b}$, where m and n are constants.

Vektor $\underline{a}$ *dan* $\underline{b}$ *adalah bukan sifar dan tidak selari.*
Diberi bahawa $(m + 2)\,\underline{a} = (n - 4)\,\underline{b}$, *dengan keadaan m dan n ialah pemalar.*

Find the value of
Cari nilai

(*a*) m,

(*b*) n.

[2 *marks*]
[2 *markah*]

Answer / *Jawapan*:

(*a*)

(*b*)

19

2

For Examiner's Use

20 Diagram 20 shows two vectors $\overrightarrow{OA}$ and $\overrightarrow{OB}$ on a Cartesian plane.

Rajah 20 *menunjukkan dua vektor* $\overrightarrow{OA}$ *dan* $\overrightarrow{OB}$ *pada satah Cartes.*

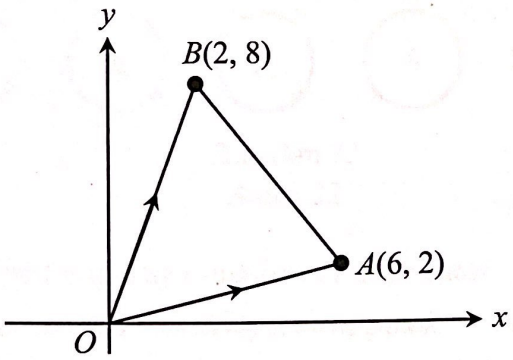


Diagram 20
Rajah 20

(*a*) State $\overrightarrow{OA}$ in the form of $x\underset{\sim}{i} + y\underset{\sim}{j}$.

Nyatakan $\overrightarrow{OA}$ *dalam bentuk* $x\underset{\sim}{i} + y\underset{\sim}{j}$.

(*b*) Express $\overrightarrow{AB}$ in the form of $\begin{pmatrix} x \\ y \end{pmatrix}$.

Ungkapkan $\overrightarrow{AB}$ *dalam bentuk* $\begin{pmatrix} x \\ y \end{pmatrix}$.

[3 *marks*]
[3 *markah*]

Answer / *Jawapan*:

(*a*)

(*b*)

20

3

21 Solve the equation cosec 2θ = sec θ for $0^\circ \leq \theta \leq 360^\circ$. [4 *marks*]

Selesaikan persamaan kosek 2θ = sek θ *untuk* $0^\circ \leq \theta \leq 360^\circ$. [4 *markah*]

Answer / *Jawapan*:

21

4

For Examiner's Use

22 Diagram 22 shows seven letter cards.

Rajah 22 menunjukkan tujuh keping kad huruf.

Diagram 22
Rajah 22

A five-letter code is to be formed by using five of these cards.

Suatu kod lima huruf hendak dibentuk dengan menggunakan lima daripada kad-kad itu.

Find

Cari

(*a*) the number of different five-letter codes that can be formed,

bilangan kod lima huruf yang berlainan dapat dibentuk,

(*b*) the number of different five-letter codes which begin with a consonant and end with a vowel.

bilangan kod lima huruf yang berlainan yang bermula dengan huruf konsonan dan berakhir dengan huruf vokal.

[4 *marks*]
[4 *markah*]

Answer / *Jawapan*:

(*a*)

(*b*)

22

4

23 A sample space of an experiment is given by $S = \{1, 2, 3, ..., 10\}$.
Events A and B are defined as follows:

Satu ruang sampel bagi satu eksperimen diberi oleh $S = \{1, 2, 3, ..., 10\}$.
Peristiwa-peristiwa A dan B ditakrifkan seperti berikut:

$$A = \{2, 3, 5, 8, 10\} \qquad B = \{1, 3, 7, 8\}$$

Find

Cari

(*a*) $P(A)$,

(*b*) $P(A$ and $B)$.

$P(A$ *dan* $B)$.

[3 *marks*]
[3 *markah*]

Answer / *Jawapan*:

(*a*)

(*b*)

23

3

24 Diagram 24 shows the standard normal distribution curve.
Rajah 24 menunjukkan lengkung taburan normal piawai.

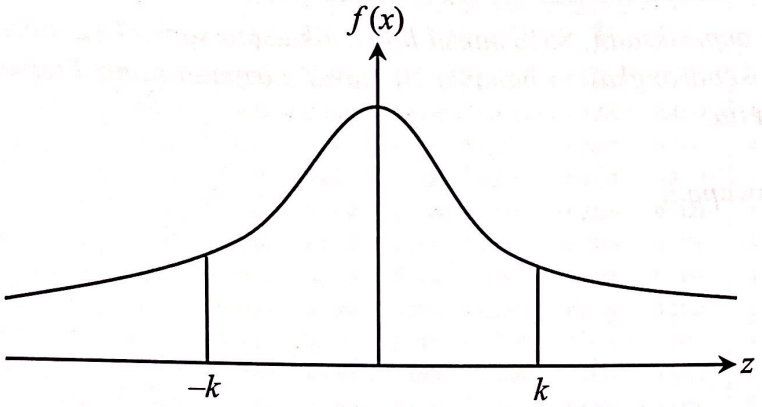


Diagram 24
Rajah 24

If $P(-k < z < k) = 0{\cdot}6354$, find $P(z < -k)$. [3 *marks*]
Jika $P(-k < z < k) = 0{\cdot}6354$, *cari* $P(z < -k)$. [3 *markah*]

Answer / *Jawapan*:

24

3

25 In an examination, 85% of the students passed. If a sample of 12 students is randomly selected, find the probability that 10 students from the sample passed the examination.
[4 *marks*]

Dalam satu peperiksaan, 85% *murid lulus. Jika satu sampel* 12 *murid dipilih secara rawak, cari kebarangkalian bahawa* 10 *murid daripada sampel tersebut lulus dalam peperiksaan itu.*
[4 *markah*]

Answer / *Jawapan*:

25

4

END OF QUESTION PAPER
KERTAS PEPERIKSAAN TAMAT

THE UPPER TAIL PROBABILITY $Q(z)$ FOR THE NORMAL DISTRIBUTION N(0,1)
KEBARANGKALIAN HUJUNG ATAS $Q(z)$ *BAGI TABURAN NORMAL* N(0, 1)

z	0	1	2	3	4	5	6	7	8	9	1	2	3	4	5	6	7	8	9
											Minus / *Tolak*								
0.0	0.5000	0.4960	0.4920	0.4880	0.4840	0.4801	0.4761	0.4721	0.4681	0.4641	4	8	12	16	20	24	28	32	36
0.1	0.4602	0.4562	0.4522	0.4483	0.4443	0.4404	0.4364	0.4325	0.4286	0.4247	4	8	12	16	20	24	28	32	36
0.2	0.4207	0.4168	0.4129	0.4090	0.4052	0.4013	0.3974	0.3936	0.3897	0.3859	4	8	12	15	19	23	27	31	35
0.3	0.3821	0.3783	0.3745	0.3707	0.3669	0.3632	0.3594	0.3557	0.3520	0.3483	4	7	11	15	19	22	26	30	34
0.4	0.3446	0.3409	0.3372	0.3336	0.3300	0.3264	0.3228	0.3192	0.3156	0.3121	4	7	11	15	18	22	25	29	32
0.5	0.3085	0.3050	0.3015	0.2981	0.2946	0.2912	0.2877	0.2843	0.2810	0.2776	3	7	10	14	17	20	24	27	31
0.6	0.2743	0.2709	0.2676	0.2643	0.2611	0.2578	0.2546	0.2514	0.2483	0.2451	3	7	10	13	16	19	23	26	29
0.7	0.2420	0.2389	0.2358	0.2327	0.2296	0.2266	0.2236	0.2206	0.2177	0.2148	3	6	9	12	15	18	21	24	27
0.8	0.2119	0.2090	0.2061	0.2033	0.2005	0.1977	0.1949	0.1922	0.1894	0.1867	3	5	8	11	14	16	19	22	25
0.9	0.1841	0.1814	0.1788	0.1762	0.1736	0.1711	0.1685	0.1660	0.1635	0.1611	3	5	8	10	13	15	18	20	23
1.0	0.1587	0.1562	0.1539	0.1515	0.1492	0.1469	0.1446	0.1423	0.1401	0.1379	2	5	7	9	12	14	16	19	21
1.1	0.1357	0.1335	0.1314	0.1292	0.1271	0.1251	0.1230	0.1210	0.1190	0.1170	2	4	6	8	10	12	14	16	18
1.2	0.1151	0.1131	0.1112	0.1093	0.1075	0.1056	0.1038	0.1020	0.1003	0.0985	2	4	6	7	9	11	13	15	17
1.3	0.0968	0.0951	0.0934	0.0918	0.0901	0.0885	0.0869	0.0853	0.0838	0.0823	2	3	5	6	8	10	11	13	14
1.4	0.0808	0.0793	0.0778	0.0764	0.0749	0.0735	0.0721	0.0708	0.0694	0.0681	1	3	4	6	7	8	10	11	13
1.5	0.0668	0.0655	0.0643	0.0630	0.0618	0.0606	0.0594	0.0582	0.0571	0.0559	1	2	4	5	6	7	8	10	11
1.6	0.0548	0.0537	0.0526	0.0516	0.0505	0.0495	0.0485	0..0475	0.0465	0.0455	1	2	3	4	5	6	7	8	9
1.7	0.0446	0.0436	0.0427	0.0418	0.0409	0.0401	0.0392	0.0384	0.0375	0.0367	1	2	3	4	4	5	6	7	8
1.8	0.0359	0.0351	0.0344	0.0336	0.0329	0.0322	0.0314	0.0307	0.0301	0.0294	1	1	2	3	4	4	5	6	6
1.9	0.0287	0.0281	0.0274	0.0268	0.0262	0.0256	0.0250	0.0244	0.0239	0.0233	1	1	2	2	3	4	4	5	5
2.0	0.0228	0.0222	0.0217	0.0212	0.0207	0.0202	0.0197	0.0192	0.0188	0.0183	0	1	1	2	2	3	3	4	4
2.1	0.0179	0.0174	0.0170	0.0166	0.0162	0.0158	0.0154	0.0150	0.0146	0.0143	0	1	1	2	2	2	3	3	4
2.2	0.0139	0.0136	0.0132	0.0129	0.0125	0.0122	0.0119	0.0116	0.0113	0.0110	0	1	1	1	2	2	2	3	3
2.3	0.0107	0.0104	0.0102								0	1	1	1	1	2	2	2	2
				0.00990	0.00964	0.00939	0.00914				3	5	8	10	13	15	18	20	23
								0.00889	0.00866	0.00842	2	5	7	9	12	14	16	16	21
2.4	0.00820	0.00798	0.00776	0.00755	0.00734						2	4	6	8	11	13	15	17	19
						0.00714	0.00695	0.00676	0.00657	0.00639	2	4	6	7	9	11	13	15	17
2.5	0.00621	0.00604	0.00587	0.00570	0.00554	0.00539	0.00523	0.00508	0.00494	0.00480	2	3	5	6	8	9	11	12	14
2.6	0.00466	0.00453	0.00440	0.00427	0.00415	0.00402	0.00391	0.00379	0.00368	0.00357	1	2	3	5	6	7	9	9	10
2.7	0.00347	0.00336	0.00326	0.00317	0.00307	0.00298	0.00289	0.00280	0.00272	0.00264	1	2	3	4	5	6	7	8	9
2.8	0.00256	0.00248	0.00240	0.00233	0.00226	0.00219	0.00212	0.00205	0.00199	0.00193	1	1	2	3	4	4	5	6	6
2.9	0.00187	0.00181	0.00175	0.00169	0.00164	0.00159	0.00154	0.00149	0.00144	0.00139	0	1	1	2	2	3	3	4	4
3.0	0.00135	0.00131	0.00126	0.00122	0.00118	0.00114	0.00111	0.00107	0.00104	0.00100	0	1	1	2	2	2	3	3	4

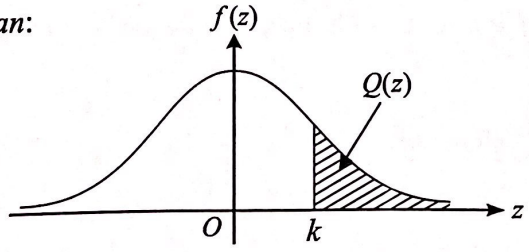
For negative z use relation:

Bagi z negatif guna hubungan:

$$Q(z) = 1 - Q(-z) = P(-z)$$

$$f(z) = \frac{1}{\sqrt{2\pi}} \exp\left(-\frac{1}{2}z^2\right)$$

$$Q(z) = \int_k^\infty f(z)\,dz$$



Example / *Contoh*:

If $X \sim N(0, 1)$, then

Jika $X \sim N(0, 1)$, *maka*

$P(X > k) = Q(k)$

$P(X > 2{\cdot}1) = Q(2{\cdot}1) = 0{\cdot}0179$

Nama ..... Tingkatan .....

Sekolah .....

MODUL PINTAS
TINGKATAN 5

3472/2

ADDITIONAL MATHEMATICS
Kertas 2

$2\frac{1}{2}$ jam

Dua jam tiga puluh minit

JANGAN BUKA KERTAS PEPERIKSAAN INI SEHINGGA DIBERITAHU

3472/2

1. *Kertas peperiksaan ini adalah dalam dwibahasa.*

2. *Soalan dalam bahasa Inggeris mendahului soalan yang sepadan dalam bahasa Melayu.*

3. *Calon dikehendaki membaca maklumat di halaman belakang kertas peperiksaan ini.*

4. *Calon dikehendaki menceraikan halaman* **21-24** *dan cantum sebagai muka hadapan bersama-sama dengan buku jawapan dengan menggunakan stapler atau menebuk lubang dan ikat.*

Kertas peperiksaan ini mengandungi 24 halaman bercetak.

The following formulae may be helpful in answering the questions. The symbols given are the ones commonly used.

Rumus-rumus berikut boleh membantu anda menjawab soalan. Simbol-simbol yang diberi adalah yang biasa digunakan.

ALGEBRA

1 $x = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

2 $a^m \times a^n = a^{m+n}$

3 $a^m \div a^n = a^{m-n}$

4 $(a^m)^n = a^{mn}$

5 $\log_a mn = \log_a m + \log_a n$

6 $\log_a \dfrac{m}{n} = \log_a m - \log_a n$

7 $\log_a m^n = n \log_a m$

8 $\log_a b = \dfrac{\log_c b}{\log_c a}$

9 $T_n = a + (n-1)d$

10 $S_n = \dfrac{n}{2}[2a + (n-1)d]$

11 $T_n = ar^{n-1}$

12 $S_n = \dfrac{a(r^n - 1)}{r - 1} = \dfrac{a(1 - r^n)}{1 - r}, \; r \neq 1$

13 $S_\infty = \dfrac{a}{1 - r}, \; |r| < 1$

CALCULUS
KALKULUS

1 $y = uv, \quad \dfrac{dy}{dx} = u\dfrac{dv}{dx} + v\dfrac{du}{dx}$

2 $y = \dfrac{u}{v}, \quad \dfrac{dy}{dx} = \dfrac{v\dfrac{du}{dx} - u\dfrac{dv}{dx}}{v^2}$

3 $\dfrac{dy}{dx} = \dfrac{dy}{du} \times \dfrac{du}{dx}$

4 Area under a curve
Luas di bawah lengkung

$= \int_a^b y \, dx$ or (*atau*)

$= \int_a^b x \, dy$

5 Volume of revolution
Isi padu kisaran

$= \int_a^b \pi y^2 \, dx$ or (*atau*)

$= \int_a^b \pi x^2 \, dy$

STATISTICS
STATISTIK

1 $\bar{x} = \dfrac{\sum x}{N}$

2 $\bar{x} = \dfrac{\sum fx}{\sum f}$

3 $\sigma = \sqrt{\dfrac{\sum (x-\bar{x})^2}{N}} = \sqrt{\dfrac{\sum x^2}{N} - \bar{x}^2}$

4 $\sigma = \sqrt{\dfrac{\sum f(x-\bar{x})^2}{\sum f}} = \sqrt{\dfrac{\sum fx^2}{\sum f} - \bar{x}^2}$

5 $m = L + \left(\dfrac{\frac{1}{2}N - F}{f_m}\right)C$

6 $I = \dfrac{Q_1}{Q_0} \times 100$

7 $\bar{I} = \dfrac{\sum W_i I_i}{\sum W_i}$

8 ${}^nP_r = \dfrac{n!}{(n-r)!}$

9 ${}^nC_r = \dfrac{n!}{(n-r)!r!}$

10 $P(A \cup B) = P(A) + P(B) - P(A \cap B)$

11 $P(X = r) = {}^nC_r p^r q^{n-r}$, $p + q = 1$

12 Mean / *Min* , $\mu = np$

13 $\sigma = \sqrt{npq}$

14 $Z = \dfrac{X - \mu}{\sigma}$

GEOMETRY
GEOMETRI

1 Distance / *Jarak*

$= \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

2 Midpoint / *Titik tengah*

$(x, y) = \left(\dfrac{x_1 + x_2}{2}, \dfrac{y_1 + y_2}{2}\right)$

3 A point dividing a segment of a line
Titik yang membahagi suatu tembereng garis

$(x, y) = \left(\dfrac{nx_1 + mx_2}{m+n}, \dfrac{ny_1 + my_2}{m+n}\right)$

4 Area of triangle / *Luas segi tiga*

$= \dfrac{1}{2}\left|(x_1y_2 + x_2y_3 + x_3y_1) - (x_2y_1 + x_3y_2 + x_1y_3)\right|$

5 $\left|\underline{\mathbf{r}}\right| = \sqrt{x^2 + y^2}$

6 $\hat{\mathbf{r}} = \dfrac{x\underline{\mathbf{i}} + y\underline{\mathbf{j}}}{\sqrt{x^2 + y^2}}$

TRIGONOMETRY
TRIGONOMETRI

1 Arc length, $s = r\theta$

Panjang lengkok, $s = j\theta$

2 Area of sector, $A = \frac{1}{2} r^2 \theta$

Luas sektor, $L = \frac{1}{2} j^2 \theta$

3 $\sin^2 A + \cos^2 A = 1$

$\sin^2 A + \text{kos}^2 A = 1$

4 $\sec^2 A = 1 + \tan^2 A$

$\text{sek}^2 A = 1 + \tan^2 A$

5 $\text{cosec}^2 A = 1 + \cot^2 A$

$\text{kosek}^2 A = 1 + \text{kot}^2 A$

6 $\sin 2A = 2 \sin A \cos A$

$\sin 2A = 2 \sin A \text{ kos } A$

7 $\cos 2A = \cos^2 A - \sin^2 A$

$= 2\cos^2 A - 1$

$= 1 - 2\sin^2 A$

$\text{kos } 2A = \text{kos}^2 A - \sin^2 A$

$= 2\,\text{kos}^2 A - 1$

$= 1 - 2\sin^2 A$

8 $\sin(A \pm B) = \sin A \cos B \pm \cos A \sin B$

$\sin(A \pm B) = \sin A \text{ kos } B \pm \text{kos } A \sin B$

9 $\cos(A \pm B) = \cos A \cos B \mp \sin A \sin B$

$\text{kos}(A \pm B) = \text{kos } A \text{ kos } B \mp \sin A \sin B$

10 $\tan(A \pm B) = \dfrac{\tan A \pm \tan B}{1 \mp \tan A \tan B}$

11 $\tan 2A = \dfrac{2\tan A}{1 - \tan^2 A}$

12 $\dfrac{a}{\sin A} = \dfrac{b}{\sin B} = \dfrac{c}{\sin C}$

13 $a^2 = b^2 + c^2 - 2bc \cos A$

$a^2 = b^2 + c^2 - 2bc \text{ kos } A$

14 Area of triangle / *Luas segi tiga*

$= \frac{1}{2} ab \sin C$

Section A
Bahagian A

[40 *marks*]
[40 *markah*]

Answer **all** questions.
Jawab **semua** *soalan.*

1 (*a*) Sketch the graph of $y = |4\cos x - 1|$ for $0 \le x \le 2\pi$. [4 *marks*]
Lakarkan graf $y = |4\kos x - 1|$ *untuk* $0 \le x \le 2\pi$. [4 *markah*]

(*b*) Hence, solve the equation $|4\cos x - 1| = 2$, for $0 \le \theta \le 2\pi$. [3 *marks*]
Seterusnya, selesaikan persamaan $|4\kos x - 1| = 2$, *bagi* $0 \le \theta \le 2\pi$. [3 *markah*]

2 It is given that $\overrightarrow{OP} = -7\underset{\sim}{x} + 12\underset{\sim}{y}$. $\overrightarrow{OQ} = 7\underset{\sim}{x} + 10\underset{\sim}{y}$ and $\overrightarrow{OR} = (m-1)\underset{\sim}{x} + 9\underset{\sim}{y}$, where m is a constant.
Diberi bahawa $\overrightarrow{OP} = -7\underset{\sim}{x} + 12\underset{\sim}{y}$. $\overrightarrow{OQ} = 7\underset{\sim}{x} + 10\underset{\sim}{y}$ *dan* $\overrightarrow{OR} = (m-1)\underset{\sim}{x} + 9\underset{\sim}{y}$, *dengan keadaan m ialah pemalar.*

(*a*) Find
Cari

(i) $\overrightarrow{PQ}$, in terms of $\underset{\sim}{x}$ and $\underset{\sim}{y}$,
$\overrightarrow{PQ}$, *dalam sebutan* $\underset{\sim}{x}$ *dan* $\underset{\sim}{y}$,

(ii) $\overrightarrow{PR}$, in terms of m, $\underset{\sim}{x}$ and $\underset{\sim}{y}$.
$\overrightarrow{PR}$, *dalam sebutan* m, $\underset{\sim}{x}$ *dan* $\underset{\sim}{y}$.

[4 *marks*]
[4 *markah*]

(*b*) If the points P, Q and R are collinear, find the value of m. [3 *marks*]
Jika titik-titik P, Q *dan* R *adalah segaris, cari nilai* m. [3 *markah*]

3 Diagram 3 shows parts of a wall which is built by using bricks of equal size. The number of bricks in the bottom row is 80. For each of the other rows, the number of bricks is 4 less than the row below it. Given the height of each brick is 8 cm and the number of bricks in the top row is 8.

Rajah 3 menunjukkan sebahagian daripada sebuah dinding yang dibina dengan menggunakan batu bata yang sama saiz. Bilangan batu bata di baris yang paling bawah ialah 80 ketul. Bagi baris-baris yang berikut, bilangan batu bata adalah 4 ketul kurang daripada baris yang di bawahnya. Diberi tinggi setiap ketul bata ialah 8 cm dan bilangan batu bata di baris yang paling atas ialah 8 ketul.

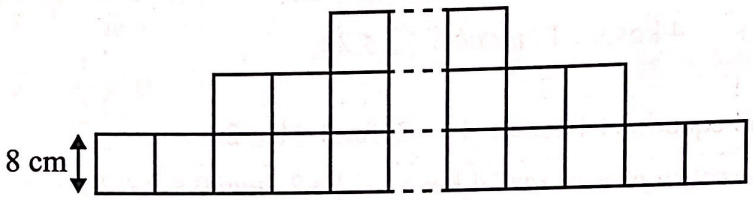


Diagram 3
Rajah 3

Calculate
Hitung

(*a*) the height, in cm, of the wall. [2 *marks*]
tinggi, dalam cm, *bagi dinding itu.* [2 *markah*]

(*b*) the total price of the bricks used if the price of one brick is 75 sen. [3 *marks*]
jumlah harga batu bata yang digunakan jika harga seketul bata ialah 75 sen. [3 *markah*]

4 Diagram 4 shows a swimming pool. The floor that surrounds the swimming pool is covered with artificial grass.

Rajah 4 *menunjukkan sebuah kolam renang. Lantai di sekeliling kolam renang itu ditutupi dengan rumput tiruan.*

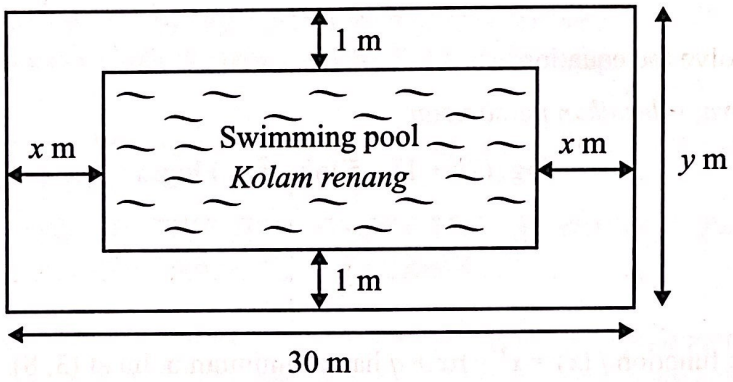


Diagram 4
Rajah 4

The length of the floor is 30 m and the length of the swimming pool is more than 20 m. If the perimeter and area of the swimming pool are 84 m and 416 m^2 respectively, find the value of x and of y. Hence, determine the area of the floor that is covered with artificial grass.

Panjang lantai ialah 30 m *dan panjang kolam renang itu adalah melebihi* 20 m. *Jika perimeter dan luas kolam renang masing-masing ialah* 84 m *dan* 416 m^2, *cari nilai x dan nilai y. Seterusnya, tentukan luas kawasan lantai yang ditutupi dengan rumput tiruan.*

[7 *marks*]
[7 *markah*]

5 (*a*) Simplify

Permudahkan

$$\log_2 (2x + 1) - 5 \log_4 x^2 + 4 \log_2 x = 3$$

[3 *marks*]
[3 *markah*]

(*b*) Hence, solve the equation:

Seterusnya, selesaikan persamaan:

$$\log_2 (2x + 1) - 5 \log_4 x^2 + 4 \log_2 x = 3$$

[4 *marks*]
[4 *markah*]

6 The quadratic function $f(x) = x^2 + px + q$ has a minimum point at (3, 8).

Fungsi kuadratik $f(x) = x^2 + px + q$ *mempunyai titik minimum pada* (3, 8).

(*a*) Find the values of p and q. [4 *marks*]

Cari nilai-nilai p dan q. [4 *markah*]

(*b*) With the values obtained in **6**(*a*), find the range of the values of x if $f(x) - 15 < 0$.

Dengan nilai-nilai yang diperoleh di **6**(*a*), *cari julat nilai-nilai x jika* $f(x) - 15 < 0$.

[3 *marks*]
[3 *markah*]

Section B
Bahagian B

[40 *marks*]
[40 *markah*]

Answer any **four** questions from this section.
Jawab mana-mana **empat** *soalan daripada bahagian ini.*

7 Use the graph paper provided on page **22** to answer this question. Detach the graph paper and tie it together with your answer booklet.

Gunakan kertas graf yang disediakan pada halaman **22** *untuk menjawab soalan ini. Ceraikan kertas graf itu dan ikat bersama-sama buku jawapan anda.*

Table 7 shows the values of two variables, x and y, obtained from an experiment.
The variables x and y are related by the equation $y = a^{b+x}$, where a and b are constants.

Jadual 7 *menunjukkan nilai-nilai bagi dua pemboleh ubah,* x *dan* y*, yang diperoleh daripada suatu eksperimen.*
Pemboleh ubah x *dan* y *dihubungkan oleh persamaan* $y = a^{b+x}$*, dengan keadaan* a *dan* b ***ialah*** *pemalar.*

x	1	2	3	4	5	6
y	2·83	6·03	11·31	22·63	42·66	89·13

Table 7
Jadual 7

(*a*) Plot $\log_{10} y$ against x, using a scale of 2 cm to 1 unit on the x-axis and 2 cm to 0·2 unit on the y-axis.
Hence, draw the line of best fit. [5 ***marks***]

Plot $\log_{10} y$ *melawan* x*, menggunakan skala* 2 cm *kepada* 1 *unit pada paksi-*x *dan* 2 cm ***kepada*** 0·2 *unit pada paksi-*y*.*
Seterusnya, lukis garis lurus penyuaian terbaik. [5 ***markah***]

(*b*) Using the graph in 7(*a*) to find the value of
Menggunakan graf di 7(*a*) *untuk mencari nilai*

(i) a,

(ii) b,

(ii) y when $x = 4{\cdot}5$.
y *apabila* $x = 4{\cdot}5$.

[5 ***marks***]
[5 ***markah***]

8 Diagram 8 shows a triangle AOB where O is the origin. Point C lies on the straight line AB.
Rajah 8 menunjukkan segi tiga AOB di mana O adalah asalan. Titik C berada pada garis lurus AB.

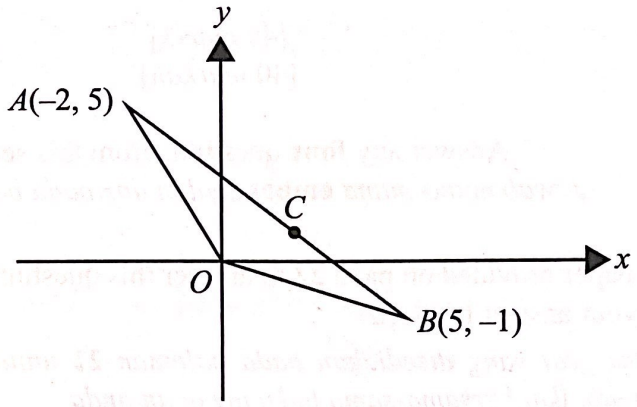


Diagram 8
Rajah 8

(*a*) Calculate the area, in unit^2, of triangle AOB. [2 *marks*]
Hitung luas, dalam unit^2, bagi segi tiga AOB. [2 *markah*]

(*b*) Given that $AC : CB = 3 : 2$, find the coordinate of C. [2 *marks*]
Diberi $AC : CB = 3 : 2$, cari koordinat C. [2 *markah*]

(*c*) Point P moves such that its distance from point A is always twice its distance from point B.
Titik P bergerak dengan keadaan jaraknya dari titik A adalah sentiasa dua kali jaraknya dari titik B.

(i) Find the equation of the locus of P. [3 *marks*]
Cari persamaan bagi lokus P. [3 *markah*]

(ii) Hence, determine whether the locus of P intersects the y-axis. [3 *marks*]
Seterusnya, tentukan sama ada lokus P menyilang paksi-y. [3 *markah*]

9 Diagram 9 shows point O is the origin. The curve $y = 4 - x^2$ intersects the straight line $y = 2x + 4$ at the points (0, 4) and (–2, 0).

Rajah 9 menunjukkan titik O adalah asalan. Lengkung $y = 4 - x^2$ *bersilang pada garis lurus* $y = 2x + 4$ *pada titik-titik* (0, 4) *dan* (–2, 0).

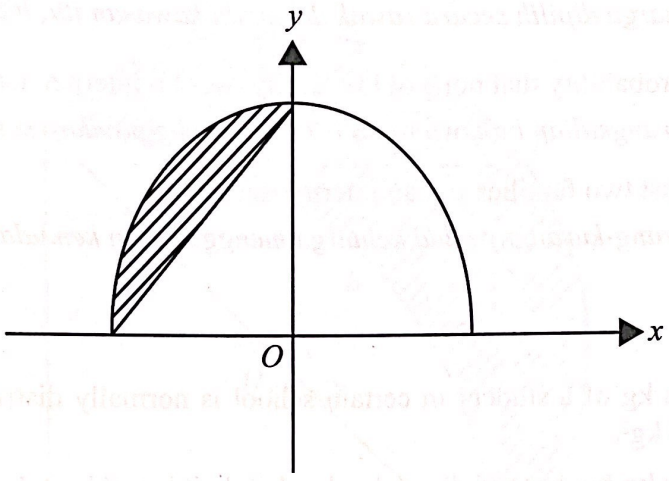


Diagram 9
Rajah 9

Calculate
Hitung

(*a*) the area of the shaded region, [6 *marks*]
luas rantau berlorek, [6 *markah*]

(*b*) the volume generated, in terms of π when the shaded region is revolved through 360° about the *y*-axis. [4 *marks*]
isi padu yang dijanakan dalam sebutan π *apabila rantau berlorek dikisarkan melalui* 360° *pada paksi-y.* [4 *markah*]

10 (*a*) In a survey, it is found that 40% of a rural family in a certain area use an internet access. If 10 families are chosen at random from the area, calculate

Dalam satu kajian, didapati bahawa 40% *keluarga di luar bandar tertentu menggunakan kemudahan internet.*
Jika 10 *keluarga dipilih secara rawak daripada kawasan itu, hitungkan*

(i) the probability that none of the family uses an internet access,
kebarangkalian bahawa tiada keluarga menggunakan kemudahan internet,

(ii) at least two families use an internet access.
sekurang-kurangnya dua keluarga menggunakan kemudahan internet.

[5 *marks*]
[5 *markah*]

(*b*) The mass in kg of a student in certain school is normally distributed with mean 50 kg and variance 64 kg^2.

Jisim dalam kg *bagi murid di sesebuah sekolah didapati bertabur secara normal dengan min* 50 kg *dan varians* 64 kg^2.

(i) Find the standard score for the mass of 65 kg.
Carikan skor piawai bagi jisim 65 kg.

(ii) If the school has 1 200 of students, calculate the number of students whose mass are between 38 kg and 65 kg.
Jika sekolah itu mempunyai 1 200 *orang murid, hitungkan bilangan murid yang mempunyai jisim antara* 38 kg *dan* 65 kg.

[5 *marks*]
[5 *markah*]

11 Diagram 11 shows a quadrant *OABC* with centre *O* and a semicircle *DAFC* with centre *D*. Given the perimeter of the quadrant *OABC* is 17·86 cm.

Rajah 11 *menunjukkan sebuah sukuan bulatan OABC dengan pusat O dan sebuah semibulatan DAFC dengan pusat D. Diberi perimeter sukuan bulatan OABC ialah* 17·86 cm.

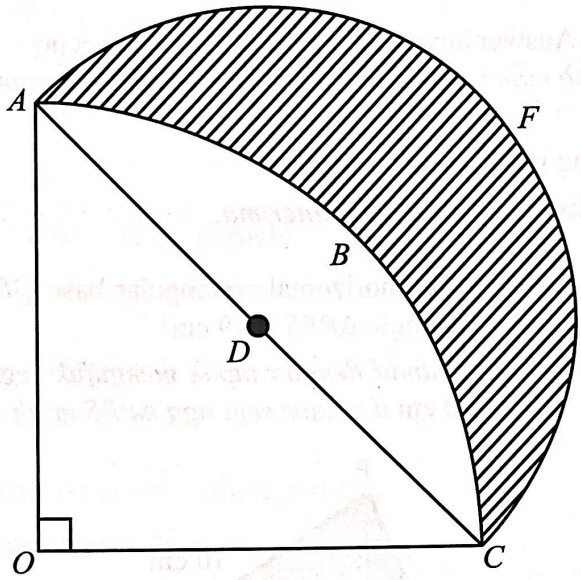


Diagram 11
Rajah 11

[Use / *Guna*, $\pi = 3{\cdot}142$]

Find
Cari

(*a*) the radius, in cm, of the quadrant *OABC*. [2 *marks*]
jejari, *dalam* cm, *sukuan bulatan OABC itu.* [2 *markah*]

(*b*) the length of *ADC*, in cm. [2 *marks*]
panjang ADC, *dalam* cm. [2 *markah*]

(*c*) the area, in cm^2, of the shaded region. [6 *marks*]
luas, *dalam* cm^2, *bagi kawasan berlorek.* [6 *markah*]

Section C
Bahagian C

[20 *marks*]
[20 *markah*]

Answer any **two** questions from this section.
Jawab mana-mana **dua** *soalan daripada bahagian ini.*

12 Solution by scale drawing is not accepted.
Penyelesaian secara lukisan berskala tidak diterima.

Diagram 12 shows a pyramid with a horizontal rectangular base *QRST*. Given that $QR = 6$ cm, $PS = PR = 10$ cm and the area of triangle ΔPRS is 19 cm^2.
Rajah 12 *menunjukkan sebuah piramid dengan tapak mengufuk segi empat tepat QRST. Diberi bahawa* $QR = 6$ cm, $PS = PR = 10$ cm *dan luas segi tiga* ΔPRS *ialah* 19 cm^2.

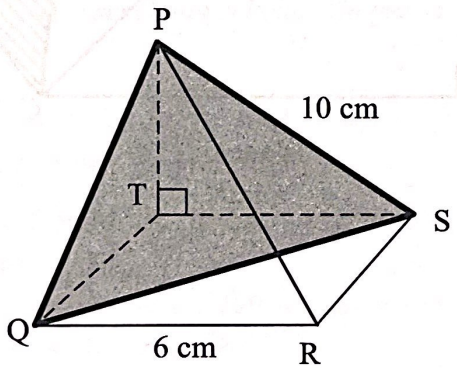


Diagram 12
Rajah 12

Find
Cari

(*a*) the length, in cm, of *RS*,
panjang, dalam cm, *bagi RS*,
[4 *marks*]
[4 *markah*]

(*b*) $\angle QPS$,
[4 *marks*]
[4 *markah*]

(*c*) the area, in cm^2, of the plane *QPS*.
luas, dalam cm^2, *bagi satah QPS*.
[2 *marks*]
[2 *markah*]

13 A particle moves along a straight line and passes through a fixed point O. Its velocity, v ms^{-1}, is given by $v = 3t^2 - 7t + 2$, where t is the time, in second after passing through O.
[Assume motion to the right positive]

Suatu zarah bergerak di sepanjang satu garis lurus dari satu titik tetap O. Halajunya v ms^{-1} *diberi oleh* $v = 3t^2 - 7t + 2$, *dengan keadaan t ialah masa, dalam saat selepas melalui O.*
[*Anggapkan gerakan ke arah kanan sebagai positif*]

Find
Cari

(*a*) the initial velocity, in ms^{-1}, of the particle, [1 *mark*]
halaju awal, dalam ms^{-1}, *bagi zarah itu,* [1 *markah*]

(*b*) the value of t, in second, when the acceleration of the particle is zero, [2 *marks*]
nilai t, dalam saat, apabila pecutan zarah adalah sifar, [2 *markah*]

(*c*) the minimum of velocity, in ms^{-1}, of the particle, [3 *marks*]
halaju minimum, dalam ms^{-1}, *bagi zarah itu,* [3 *markah*]

(*d*) the total distance, in m, travelled by the particle in the first 2 seconds. [4 *marks*]
jumlah jarak, dalam m, yang dilalui oleh zarah itu dalam 2 saat pertama. [4 *markah*]

14 Table 14 shows the prices, the price indices and the percentage composition of four ingredients, P, Q, R and S used in making health drink juice in the year 2016 based on the year 2014.

Jadual 14 *menunjukkan harga, indeks harga dan peratus kandungan empat bahan, P, Q, R dan S yang digunakan untuk membuat jus minuman kesihatan pada tahun* 2016 *berasaskan tahun* 2014.

Ingredient ***Bahan***	**Price per kg (RM) for the year** ***Harga per* kg (RM) *pada tahun***		**Price index for the year 2016 based on the year 2014** ***Indeks harga pada tahun* 2016 *berasaskan tahun* 2014**	**Percentage composition** ***Peratus kandungan***
	2014	**2016**		
P	6.50	8.12	x	35
Q	6.00	7.50	125	25
R	12.00	y	135	20
S	Z	29.00	116	20

Table 14
Jadual 14

(*a*) Find the value of x, of y and of z. [3 *marks*]
Cari nilai x, nilai y dan nilai z. [3 *markah*]

(*b*) (i) Calculate the composite index for the cost of making the health drink juice in the year 2016 based on the year 2014. [3 *marks*]
Hitung indeks gubahan kos untuk membuat jus minuman kesihatan itu pada tahun 2016 *berasaskan tahun* 2014. [3 *markah*]

(ii) Hence, calculate the corresponding cost of the making the health drink juice in the year 2014 if the cost in the year 2016 is RM28.30. [2 *marks*]
Seterusnya, hitung kos sepadan untuk membuat jus minuman kesihatan itu pada tahun 2014 *jika kos pada tahun* 2016 *ialah* RM28.30. [2 *markah*]

(*c*) The cost of making these health drink juice is expected to increase by 20% from the year 2016 to 2018.

Find the expected composite index for the cost of making the health drink juice in the year 2018 based on the year 2014. [2 *marks*]

Kos membuat jus minuman kesihatan itu dijangka meningkat sebanyak 20% *dari tahun* 2016 *ke tahun* 2018.

Cari indeks gubahan kos yang dijangkakan untuk membuat jus minuman kesihatan itu pada tahun 2018 *berasaskan tahun* 2014. [2 *markah*]

15 Use the graph paper provided on page **23** to answer this question. Detach the graph paper and tie it together with your answer booklet.

Gunakan kertas graf yang disediakan pada halaman **23** *untuk menjawab soalan ini. Ceraikan kertas graf itu dan ikat bersama-sama buku jawapan anda.*

A shopkeeper is planning to buy two brands of breads, which are Deli and Cream. The numbers of Deli and Cream breads which are to be bought are x units and y units respectively. The number of breads must fulfil the following constraints:

Seorang penjaga kedai bercadang untuk membeli dua jenama roti, iaitu Deli dan Cream. Bilangan roti Deli dan Cream yang bakal dibeli masing-masing ialah x unit dan y unit. Bilangan roti-roti itu mesti memenuhi kekangan-kekangan yang berikut:

I The maximum total number of breads is 90 units.
Jumlah maksimum bilangan roti adalah 90 *unit.*

II The total price of buying the breads must be at least RM120, given that a Deli bread costs RM4 while a Cream bread costs RM3.
Jumlah harga untuk membeli roti-roti itu mestilah sekurang-kurangnya RM120, *diberi bahawa kos bagi satu roti Deli ialah* RM4 *manakala kos bagi satu roti Cream ialah* RM3.

III The number of Cream bread is not more than three times the number of Deli bread.
Bilangan roti Cream tidak melebihi tiga kali ganda bilangan roti Deli.

(*a*) Write three inequalities, other than $x \geq 0$ and $y \geq 0$, which satisfy all the above constraints.
[3 *marks*]
Tulis tiga ketaksamaan, selain daripada $x \geq 0$ *dan* $y \geq 0$, *yang memenuhi semua kekangan di atas.*
[3 *markah*]

(*b*) Use a scale of 2 cm to 10 units on both axes, construct and shade the region R which satisfies all the above constraints.
[3 *marks*]
Gunakan skala 2 cm *kepada* 10 unit *pada kedua-dua paksi, bina dan lorek rantau R yang memenuhi semua kekangan di atas.*
[3 *markah*]

(*c*) Use the graph constructed in **15**(*b*), find
Gunakan graf yang dibina di **15**(*b*), *cari*

(i) the range number of Cream breads if the number of Deli breads bought is 40 units,
julat bilangan roti Cream jika bilangan roti Deli yang dibeli ialah 40 *unit*,

(ii) the maximum profit obtained by the shopkeeper if the profits of selling a Deli bread and a Cream bread are 20 sen and 40 sen respectively.
keuntungan maksimum yang diperoleh oleh penjaga kedai itu jika keuntungan menjual satu roti Deli dan satu roti Cream masing-masing ialah 20 *sen dan* 40 *sen.*

[4 *marks*]
[4 *markah*]

END OF QUESTION PAPER
KERTAS PEPERIKSAAN TAMAT

THE UPPER TAIL PROBABILITY $Q(z)$ FOR THE NORMAL DISTRIBUTION N(0,1)
KEBARANGKALIAN HUJUNG ATAS $Q(z)$ BAGI TABURAN NORMAL N(0, 1)

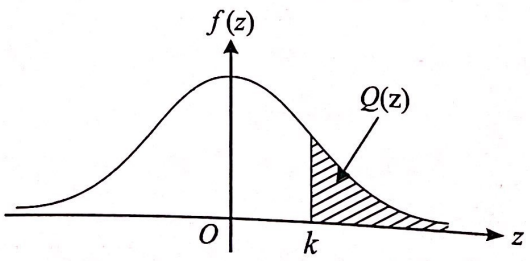
z	0	1	2	3	4	5	6	7	8	9	1	2	3	4	5	6	7	8	9
											Minus / *Tolak*								
0.0	0.5000	0.4960	0.4920	0.4880	0.4840	0.4801	0.4761	0.4721	0.4681	0.4641	4	8	12	16	20	24	28	32	36
0.1	0.4602	0.4562	0.4522	0.4483	0.4443	0.4404	0.4364	0.4325	0.4286	0.4247	4	8	12	16	20	24	28	32	36
0.2	0.4207	0.4168	0.4129	0.4090	0.4052	0.4013	0.3974	0.3936	0.3897	0.3859	4	8	12	15	19	23	27	31	35
0.3	0.3821	0.3783	0.3745	0.3707	0.3669	0.3632	0.3594	0.3557	0.3520	0.3483	4	7	11	15	19	22	26	30	34
0.4	0.3446	0.3409	0.3372	0.3336	0.3300	0.3264	0.3228	0.3192	0.3156	0.3121	4	7	11	15	18	22	25	29	32
0.5	0.3085	0.3050	0.3015	0.2981	0.2946	0.2912	0.2877	0.2843	0.2810	0.2776	3	7	10	14	17	20	24	27	31
0.6	0.2743	0.2709	0.2676	0.2643	0.2611	0.2578	0.2546	0.2514	0.2483	0.2451	3	7	10	13	16	19	23	26	29
0.7	0.2420	0.2389	0.2358	0.2327	0.2296	0.2266	0.2236	0.2206	0.2177	0.2148	3	6	9	12	15	18	21	24	27
0.8	0.2119	0.2090	0.2061	0.2033	0.2005	0.1977	0.1949	0.1922	0.1894	0.1867	3	5	8	11	14	16	19	22	25
0.9	0.1841	0.1814	0.1788	0.1762	0.1736	0.1711	0.1685	0.1660	0.1635	0.1611	3	5	8	10	13	15	18	20	23
1.0	0.1587	0.1562	0.1539	0.1515	0.1492	0.1469	0.1446	0.1423	0.1401	0.1379	2	5	7	9	12	14	16	19	21
1.1	0.1357	0.1335	0.1314	0.1292	0.1271	0.1251	0.1230	0.1210	0.1190	0.1170	2	4	6	8	10	12	14	16	18
1.2	0.1151	0.1131	0.1112	0.1093	0.1075	0.1056	0.1038	0.1020	0.1003	0.0985	2	4	6	7	9	11	13	15	17
1.3	0.0968	0.0951	0.0934	0.0918	0.0901	0.0885	0.0869	0.0853	0.0838	0.0823	2	3	5	6	8	10	11	13	14
1.4	0.0808	0.0793	0.0778	0.0764	0.0749	0.0735	0.0721	0.0708	0.0694	0.0681	1	3	4	6	7	8	10	11	13
1.5	0.0668	0.0655	0.0643	0.0630	0.0618	0.0606	0.0594	0.0582	0.0571	0.0559	1	2	4	5	6	7	8	10	11
1.6	0.0548	0.0537	0.0526	0.0516	0.0505	0.0495	0.0485	0.0475	0.0465	0.0455	1	2	3	4	5	6	7	8	9
1.7	0.0446	0.0436	0.0427	0.0418	0.0409	0.0401	0.0392	0.0384	0.0375	0.0367	1	2	3	4	4	5	6	7	8
1.8	0.0359	0.0351	0.0344	0.0336	0.0329	0.0322	0.0314	0.0307	0.0301	0.0294	1	1	2	3	4	4	5	6	6
1.9	0.0287	0.0281	0.0274	0.0268	0.0262	0.0256	0.0250	0.0244	0.0239	0.0233	1	1	2	2	3	4	4	5	5
2.0	0.0228	0.0222	0.0217	0.0212	0.0207	0.0202	0.0197	0.0192	0.0188	0.0183	0	1	1	2	2	3	3	4	4
2.1	0.0179	0.0174	0.0170	0.0166	0.0162	0.0158	0.0154	0.0150	0.0146	0.0143	0	1	1	2	2	2	3	3	4
2.2	0.0139	0.0136	0.0132	0.0129	0.0125	0.0122	0.0119	0.0116	0.0113	0.0110	0	1	1	1	2	2	2	3	3
2.3	0.0107	0.0104	0.0102								0	1	1	1	1	2	2	2	2
				0.00990	0.00964	0.00939	0.00914				3	5	8	10	13	15	18	20	23
								0.00889	0.00866	0.00842	2	5	7	9	12	14	16	16	21
2.4	0.00820	0.00798	0.00776	0.00755	0.00734						2	4	6	8	11	13	15	17	19
						0.00714	0.00695	0.00676	0.00657	0.00639	2	4	6	7	9	11	13	15	17
2.5	0.00621	0.00604	0.00587	0.00570	0.00554	0.00539	0.00523	0.00508	0.00494	0.00480	2	3	5	6	8	9	11	12	14
2.6	0.00466	0.00453	0.00440	0.00427	0.00415	0.00402	0.00391	0.00379	0.00368	0.00357	1	2	3	5	6	7	9	9	10
2.7	0.00347	0.00336	0.00326	0.00317	0.00307	0.00298	0.00289	0.00280	0.00272	0.00264	1	2	3	4	5	6	7	8	9
2.8	0.00256	0.00248	0.00240	0.00233	0.00226	0.00219	0.00212	0.00205	0.00199	0.00193	1	1	2	3	4	4	5	6	6
2.9	0.00187	0.00181	0.00175	0.00169	0.00164	0.00159	0.00154	0.00149	0.00144	0.00139	0	1	1	2	2	3	3	4	4
3.0	0.00135	0.00131	0.00126	0.00122	0.00118	0.00114	0.00111	0.00107	0.00104	0.00100	0	1	1	2	2	2	3	3	4

For negative z use relation:
Bagi z negatif guna hubungan:

$$Q(z) = 1 - Q(-z) = P(-z)$$

$$f(z) = \frac{1}{\sqrt{2\pi}} \exp\left(-\frac{1}{2}z^2\right)$$

$$Q(z) = \int_k^\infty f(z)\,dz$$



Example / *Contoh*:

If $X \sim$ N(0, 1), then
Jika $X \sim$ N(0, 1), *maka*

$P(X > k) = Q(k)$

$P(X > 2{\cdot}1) = Q(2{\cdot}1) = 0{\cdot}0179$

NO. KAD PENGENALAN | | | | | | | - | | | - | | | | |

ANGKA GILIRAN | | | | | | | | | |

Nama ..... Tingkatan .....

Sekolah .....

Arahan Kepada Calon

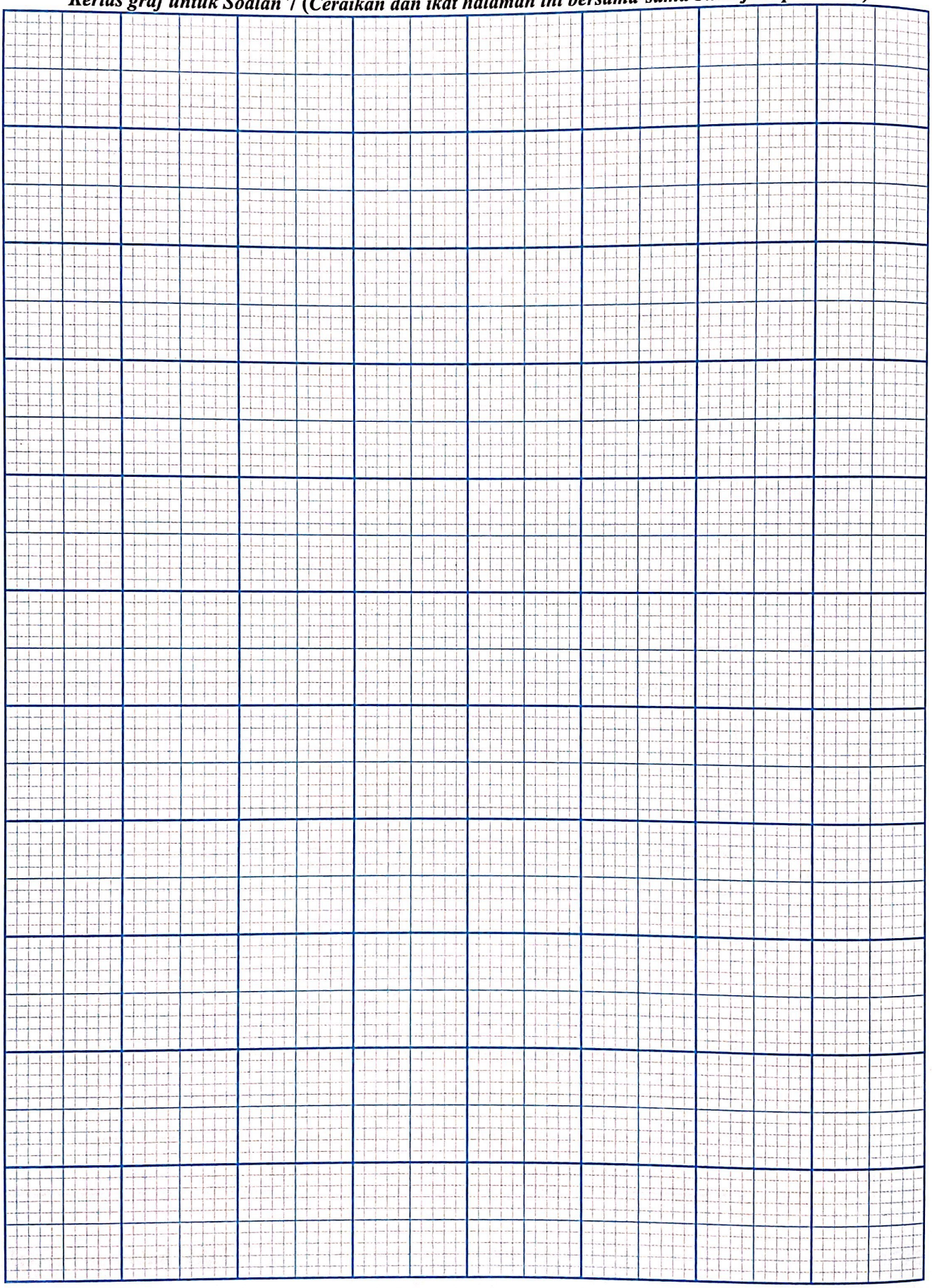
1. Tulis **nombor kad pengenalan, angka giliran, nama, tingkatan** dan **sekolah** anda pada petak yang disediakan.
2. Tandakan (✓) untuk soalan yang dijawab pada ruangan Soalan Dijawab.
3. Ceraikan helaian ini dan ikat sebagai muka hadapan bersama-sama dengan buku jawapan.

Kod Pemeriksa				
Bahagian	Soalan	Soalan Dijawab	Markah Penuh	Markah Diperoleh (*Untuk Kegunaan Pemeriksa*)
A	1		7	
	2		7	
	3		5	
	4		7	
	5		7	
	6		7	
B	7		10	
	8		10	
	9		10	
	10		10	
	11		10	
C	12		10	
	13		10	
	14		10	
	15		10	
Jumlah				

No. Kad Pengenalan ..... Angka Giliran .....

Graph paper for Question 7 (Detach and tie this page together with your answer booklet)

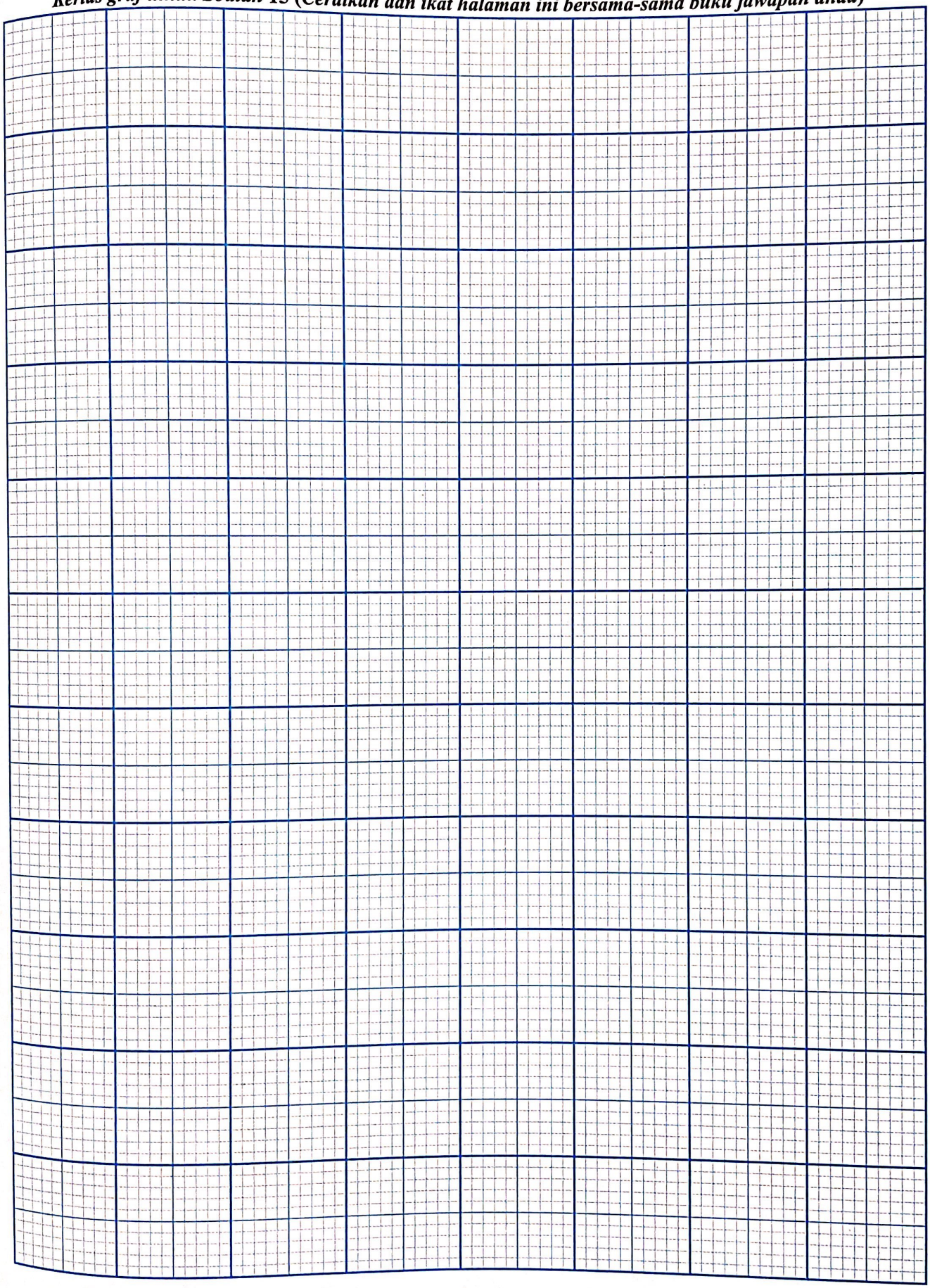
Kertas graf untuk Soalan 7 (Ceraikan dan ikat halaman ini bersama-sama buku jawapan anda)



No. Kad Pengenalan ..... Angka Giliran .....

Graph paper for Question 15 (Detach and tie this page together with your answer booklet)

***Kertas graf untuk Soalan* 15 (*Ceraikan dan ikat halaman ini bersama-sama buku jawapan anda*)**



INFORMATION FOR CANDIDATES
MAKLUMAT UNTUK CALON

1. This question paper consists of three sections: **Section A**, **Section B** and **Section C**.

   Kertas peperiksaan ini mengandungi tiga bahagian: ***Bahagian* A**, ***Bahagian* B** *dan* ***Bahagian* C**.

2. Answer **all** questions in **Section A**, any **four** questions from **Section B** and any **two** questions from **Section C**.

   Jawab **semua** *soalan dalam* ***Bahagian* A**, *mana-mana* **empat** *soalan daripada* ***Bahagian* B** dan *mana-mana* **dua** *soalan daripada* ***Bahagian* C**.

3. Write your answers on the 'buku jawapan' provided. If the 'buku jawapan' is insufficient, you may ask for 'helaian tambahan' from the invigilator.

   Jawapan anda hendaklah ditulis di dalam buku jawapan yang disediakan. Sekiranya buku jawapan tidak mencukupi, sila dapatkan helaian tambahan daripada pengawas peperiksaan.

4. Show your working. It may help you to get marks.

   Tunjukkan langkah-langkah penting dalam kerja mengira anda. Ini boleh membantu anda untuk mendapatkan markah.

5. The diagrams in the questions provided are not drawn to scale unless stated.

   Rajah yang mengiringi soalan tidak dilukis mengikut skala kecuali dinyatakan.

6. The marks allocated for each question and sub-part of a question are shown in brackets.

   Markah yang diperuntukkan bagi setiap soalan dan ceraian soalan ditunjukkan dalam kurungan.

7. The Upper Tail Probability $Q(z)$ For The Normal Distribution N(0, 1) Table is provided on page **20**.

   Jadual Kebarangkalian Hujung Atas $Q(z)$ *Bagi Taburan Normal* N(0, 1) *disediakan di halaman* **20**.

8. A list of formulae is provided on pages **2** to **4**.
   Satu senarai rumus disediakan di halaman **2** *hingga* **4**.

9. Graph paper is provided.

   Kertas graf disediakan.

10. You may use a scientific calculator.

    Anda dibenarkan menggunakan kalkulator saintifik.

11. The candidates are given a choice to either combine the 'helaian tambahan' and the graph papers together with the 'buku jawapan' by using stapler or punching a hole on the papers. Then, tie the papers together and hand in to the invigilator at the end of the examination.

    Calon ada pilihan sama ada mencantumkan helaian tambahan dan kertas graf bersama-sama dengan buku jawapan dengan menggunakan stapler atau menebuk lubang dan ikat kemudian serahkan kepada pengawas peperiksaan pada akhir peperiksaan.

★ SULIT

MODUL PINTAS (MP) TINGKATAN 5

ERATA

KOD : 3472/2

MATA PELAJARAN : ADDITIONAL MATHEMATICS (KERTAS 2)

SOALAN 15 ASAL (m/s 18):

15 II The total price of buying the breads must be at least RM120, given that a Deli bread costs RM4 while a Cream bread costs RM3.
Jumlah harga untuk membeli roti-roti itu mestilah sekurang-kurangnya RM120, *diberi bahawa kos bagi satu roti Deli ialah* RM4 *manakala kos bagi satu roti Cream ialah* RM3.

SOALAN 15 PEMBETULAN (m/s 18):

15 II The total price of buying the breads must be at least RM360, given that a Deli bread costs RM4 while a Cream bread costs RM3.
Jumlah harga untuk membeli roti-roti itu mestilah sekurang-kurangnya RM360, *diberi bahawa kos bagi satu roti Deli ialah* RM4 *manakala kos bagi satu roti Cream ialah* RM3.

MODUL PINTAS
TINGKATAN 5

3472/1

ADDITIONAL MATHEMATICS
Kertas 1

2 jam

Dua jam

PERATURAN PEMARKAHAN
ADDITIONAL MATHEMATICS K1
3472/1

1.	**(a)**	$k = 11$	**1 mark**
	(b)	$f(x) = x + 3$	**1 mark**
2.	**(a)**	$3t - 2 = 0$ $t = \frac{2}{3}$	**2 marks** **B1**
	(b)	$0 \leq f(x) \leq 10$	**1 mark**
3.		$k = 15\ dan\ p = 2$ $k = 15\ atau\ p = 2$ $\frac{-(5-k)}{2} = 3 + p\ dan - \frac{3}{2} + \frac{k}{2} = 3p$ $x^2 + \frac{(5-k)}{2}x - \frac{3}{2} + \frac{k}{2} = 0\ dan\ x^2 - (3+p)x + 3p = 0$	**4 marks** **B3** **B2** **B1**
4.	**(a)**	$m = \frac{1}{3}\ \ dan\ n = 2$ $0 = -m(5-2)^2 + 3$	**2 marks** **B1**
	(b)	(2,3)	**1 mark**
	(c)	$x = 2$	**1 mark**
5.		$p > 2\ dan\ p < -2$ $(p+2)(p-2) > 0$ $p^2 - 4(1)(1) > 0$	**3 marks** **B2** **B1**
6.	**(a)**	$b + 3a$ $log_2 X + 3log_2 Y$	**2 marks** **B1**
	(b)	$\frac{a}{3}$ $\frac{log_2 Y}{3}$	**2 marks** **B1**
7.		$n = \frac{1}{3}$ $2 + n - 1 = 4n$	**3 marks** **B2**

	$2^2(2^{n-1}) = 2^{4n}$	**B1**
8.	$3y = -x + 7 \; atau \; y = -\frac{1}{3}x + \frac{7}{3}$	**2 marks**
	$3 = -\frac{1}{3}(-2) + c \; atau \; m = -\frac{1}{3}$	**B1**
9.	$9x^2 + 9y^2 - 72x - 36y - 400 = 0$	**3 marks**
	$4(145) = 9(x^2 - 8x + 16 + y^2 - 4y + 4)$	**B2**
	$2\sqrt{(4-13)^2 + (2-8)^2} = 3\sqrt{(x-4)^2 + (y-2)^2}$	**B1**
10.	**(a)** $x = 5$	**1 mark**
	(b) $\sigma = 3.742$	**2 marks**
	$\sqrt{\frac{287}{8} - 25}$	**B1**
11.	**(a)** $\bar{x} = 15$	**1 mark**
	(b) $\sigma^2 = 37.5$	**2 marks**
	$\sigma^2 = \frac{2100}{8} - 15^2$	**B1**
12.	$Luas \; kawasan \; berlorek = 19.66 \; cm^2$	**3 marks**
	$Luas = \frac{1}{2}(8)^2(1.0473) - \frac{1}{2}(4)(8 \; sin60°)$	**B2**
	$\theta = 60°$ @ 1.0473	**B1**
13.	**(a)** $\frac{dy}{dx} = 12$	**2 marks**
	$\frac{dy}{dx} = 10x + 2$	**B1**
	(b) $\delta y = 12q$	**2 marks**
	$\delta y = 12 \times q$	**B1**
14.	$43, 46, 49$	**3 marks**
	$a + a + d + a + 2d = 138$ @ $a = 43$	**B2**
	$d = 3$	**B1**

15.	$S_\infty = 27$ $S_\infty = \frac{18}{1-\frac{1}{3}}$ $d = \frac{1}{3}$	**3 marks** **B2** **B1**
16.	$n = 20$ $54 + (n-1)(-3) < 0$ $d = -3$	**3 marks** **B2** **B1**
17.	**(a)** $h = 5\ and\ k = 3$ $h = 5\ or\ k = 3$ $1 = -\frac{2}{3}(h) + \frac{11}{3}\ or\ k = -\frac{2}{3}(1) + \frac{11}{3}$	**3 marks** **B2** **B1**
18.	**(a)** $k = 9$ $k(2) - 18 = 0$	**2 marks** **B1**
	(b) $y = \frac{9}{2}x^2 - 18x + 21\ or\ 2y = 9x^2 - 36x + 42$ $3 = \frac{9}{2}(2)^2 - 18(2) + c$	**2 marks** **B1**
19.	**(a)** $m = -2$ **(b)** $n = 4$	**1 mark** **1 mark**
20.	**(a)** $\overrightarrow{OA} = 6i + 2j$	**1 mark**
	(b) $\overrightarrow{AB} = \begin{pmatrix} -4 \\ 6 \end{pmatrix}$ $\overrightarrow{AB} = \begin{pmatrix} -6 \\ -2 \end{pmatrix} + \begin{pmatrix} 2 \\ 8 \end{pmatrix}$	**2 marks** **B1**
21.	$\theta = 30^o, 150^o$ $\sin\theta = \frac{1}{2}$ $kos\ \theta = 2sin\theta kos\theta$	**4marks** **B3** **B2**

	$\frac{1}{sin\,2\theta} = \frac{1}{kos\,\theta}$	**B1**
22.	**(a)** 2520	**2 marks**
	$^{7}P_{5}$	**B1**
	(b) 720	**2 marks**
	$^{4}P_{1} \times {}^{5}P_{3} \times {}^{2}P_{1}$	**B1**
23.	**(a)** $\frac{1}{2}$	**1 mark**
	(b) $\frac{1}{5}$	**2 marks**
	$\frac{2}{10}$	**B1**
24.	0.1823	**3 marks**
	$\frac{0.3646}{2}$ @0.3646	**B2**
	$\frac{1 - 0.6354}{2}$	**B1**
25.	0.2924	**4 marks**
	$^{12}C_{10}(0.85)^{10}(0.15)^{2}$	**B3**
	$n = 12, p = 0.85, q = 0.15$	**B2**
	$Kebarangkalian\ lulus = 0.85, kebarangkalian\ gagal = 0.15$	**B1**

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MODUL PINTAS
TINGKATAN 5

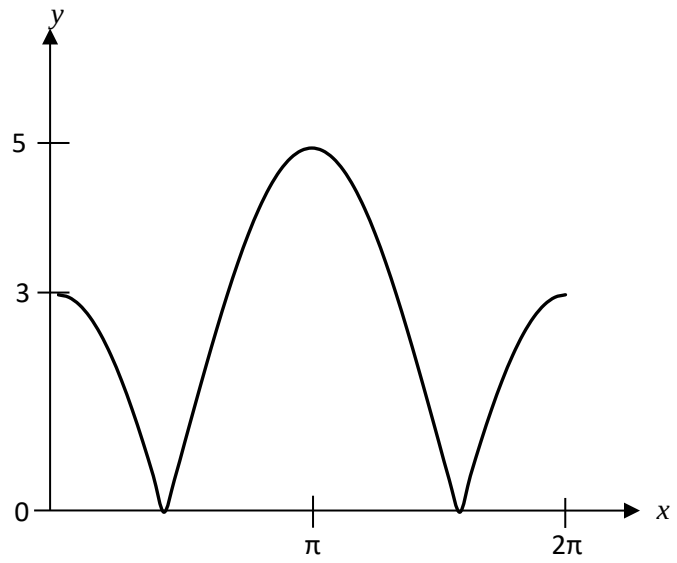
3472/2

ADDITIONAL MATHEMATICS
Kertas 2

$2\frac{1}{2}$ jam

Dua jam tiga puluh minit

PERATURAN PEMARKAHAN
ADDITIONAL MATHEMATICS K2
3472/2

No.	Solution and Mark Scheme	Sub Marks	Total Marks
1(a)	 Shape of cosine graph P1 Max = 5, Min = 0 (Amplitude = 4) P1 Cosine graph for 0≤x≤2π P1 } Accept sine graph Modulus of cosine graph P1 Note: 1. Do not accept tangent graph 2. Ignore graph outside the range	4	
(b)	$4kosx - 1 = 2$ *and* $4kosx - 1 = -2$ K1 K1 $Based\ angle = 41.41^o$ N1 $x = 41.41^o, 104.48^o, 255.52^o, 318.59^o$	3	
			7

No.	Solution and Mark Scheme	Sub Marks	Total Marks
2*(a)(i)*	Use triangle law K1 $\overrightarrow{PQ} = \overrightarrow{PO} + \overrightarrow{OQ}$ Or $7x - 12y + 7x + 10y$ N1 $\overrightarrow{PQ} = 14x - 2y$	4	
(a)(ii)	Use triangle law K1 $\overrightarrow{PR} = \overrightarrow{PO} + \overrightarrow{OR}$ Or $7x - 12y + (m-1)x + 9y$ N1 $\overrightarrow{PQ} = (6+m)x - 3y$		
(b)	$\overrightarrow{PQ} = \lambda \overrightarrow{PR}$ K1 K1 Compare coefficient of *y* $-2 = -3\lambda$ N1 $m = 15$	3	
			7

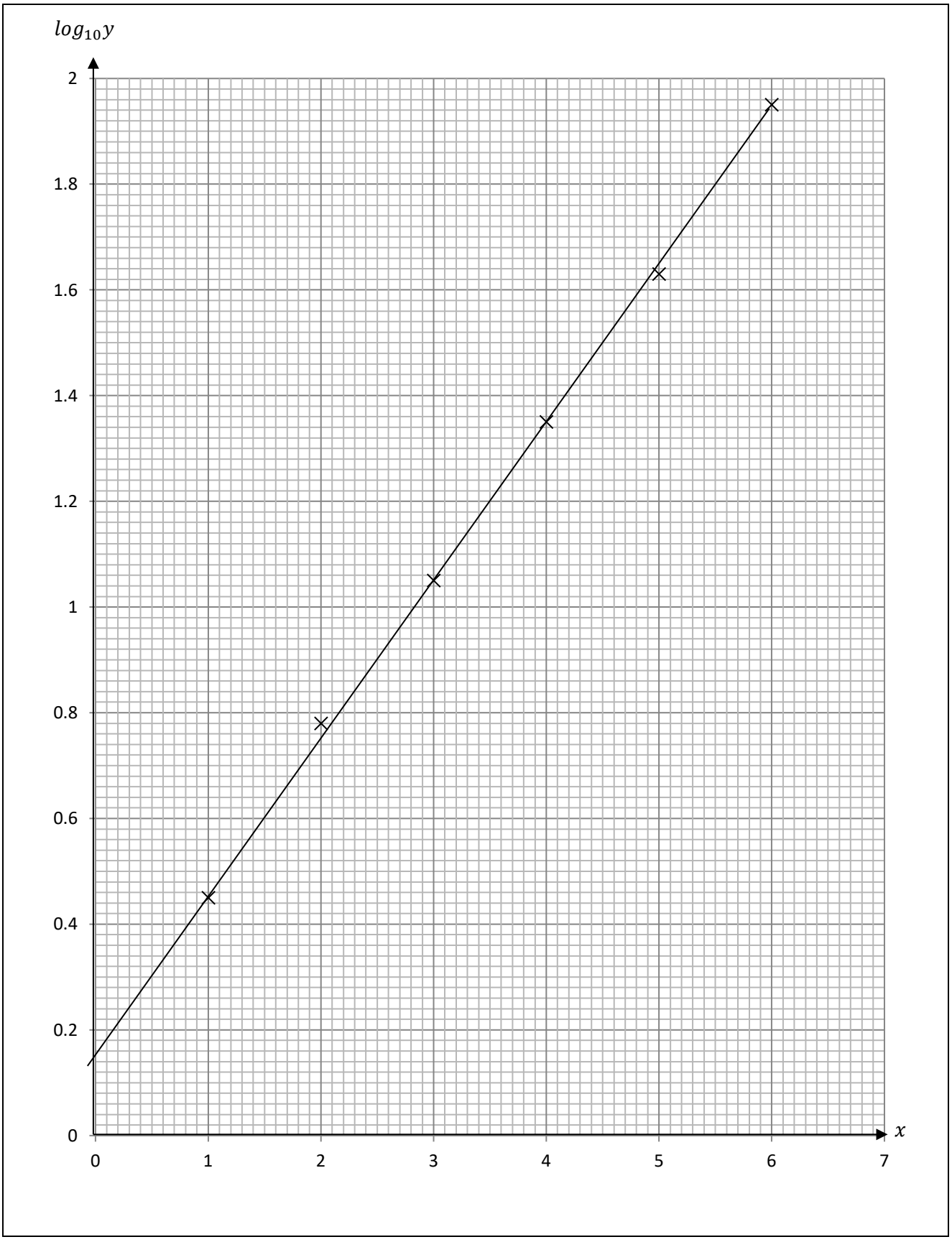
No.	Solution and Mark Scheme	Sub Marks	Total Marks
3*(a)*	$8 = 80 + (n-1)(-4)$ K1 and $get\ n = 19$ N1 $Height = 152\ cm$	2	
(b)	$S_{19} = \frac{19}{2}[2(80) + (19-1)(-4)]$ K1 K1 $836 \times RM0.75$ N1 $RM\ 627$	3	
			5

No.	Solution and Mark Scheme	Sub Marks	Total Marks
4	$-2x + y = 14$ or $15y - xy + 2x = 238$ P1 $y = 2x + 14$ or $x = \frac{y-14}{2}$ P1 K1 $15(2x + 14) - x(2x + 14) + 2x = 238$ or $15y - \left(\frac{y-14}{2}\right)y + 2\left(\frac{y-14}{2}\right) = 238$ K1 Solve the quadratic equation $ax^2 + bx + c = 0 \; for \; b \neq 0$ **Completing the square** $\left(x - \frac{9}{2}\right)^2 - \left(-\frac{9}{2}\right)^2 - 14 = 0$ or $(y - 23)^2 - (-23)^2 + 504 = 0$ **OR** **Formula** $x = \frac{-(-9) \pm \sqrt{(-9)^2 - 4(1)(-14)}}{2(1)}$ or $y = \frac{-(-46) \pm \sqrt{(-46)^2 - 4(1)(504)}}{2(1)}$ **OR** **Factorisation** $(x - 7)(x - 2) = 0$ or $(y - 28)(y - 18) = 0$ N1 $x = 7, 2$ **or** $y = 28, 18$ N1 $y = 28, 18$ **or** $x = 7, 2$ N1 *Luas kawasan berlitup dengan rumput tiruan* $= 124\ m^2$ *Hanya guna* $x = 2m$ *dan* $y = 18m$ *untuk memenuhi syarat panjang kolam renang mesti melebihi* $20m$	7	**7**

No.	Solution and Mark Scheme	Sub Marks	Total Marks
5*(a)*	Use law of logarithma $\frac{5log_2x^2}{2}$ *or* log_2x^4 K1 K1 Use law of logarithma $log_2\frac{2x+1}{x^5}\times x^4$ N1 $log_2\frac{2x+1}{x}=3$	3	
(b)	$log_2\frac{2x+1}{x}=log_2 2^3$ K1 K1 $\frac{2x+1}{x}=8$ K1 $6x=1$ N1 $x=\frac{1}{6}$	4	
			7

No.	Solution and Mark Scheme	Sub Marks	Total Marks
6*(a)*	**Use Completing the Square** $\left(x+\frac{p}{2}\right)^2-\left(\frac{p}{2}\right)^2+q$ K1 K1 Compare the value of x and y $-\frac{p}{2}=3$ *or* $\frac{p^2}{4}+q=8$ $p=-6\ or\ q=-1$ N1 K1 $q=-1\ or\ p=-6$	4	
(b)	Subtitute $p=-6\ and\ q=-1$ into $f(x)-15<0$ K1 K1 Solve the quadratic inequalities $(x-8)(x+2)<0$ N1 $-2<x<8$	3	
			7

No.	Solution and Mark Scheme	Sub Marks	Total Marks
7*(a)*	$log_{10}y$ | 0.45 | 0.78 | 1.05 | 1.35 | 1.63 | 1.95	N1 1	
	Plot $log_{10}y$ against x (Correct axes and uniform scales) K1		
	6 *points plotted correctly N1 If table not shown, all the points are correctly plotted award **N1**	3	
	Line of best fit (At least *5 points plotted) N1		
	$log_{10}y = log_{10}a(x) + blog_{10}a$ P1 Implied	1	
(b)(i)(ii)	$Use * m = log_{10}a$ K1 K1 $Use * c = blog_{10}a$ $a = 1.995$ N1 N1 $b = 0.5$	5	
(iii)	N1 $y = 31.62$		
			10
	Note: **SS-1** if part of scale is not uniform at the $log_{10}y - axis$ and/or the $x - axis$ from the first point to the last point **OR** does not use the given scales **OR** does not use the graph paper		


$log_{10}y$
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
0
1
2
3
4
5
6
7
x

No.	Solution and Mark Scheme	Sub Marks	Total Marks
8*(a)*	$\frac{1}{2}\left\|\begin{matrix}[(-2\times -1)+0+0] \\ -[(5\times 5)+0+0]\end{matrix}\right\|$ K1 N1 $11.5@\frac{23}{2}@11\frac{1}{2}\ unit^2$	2	
(b)	$\left(\frac{(-2\times 2)+(5\times 3)}{2+3},\frac{(5\times 2)+(-1\times 3)}{2+3}\right)$ K1 N1 $\left(\frac{11}{5},\frac{7}{5}\right)$	2	
(c)(i)	$PA=\sqrt{(x+2)^2+(y-5)^2}$ K1 Or $PB=\sqrt{(x-5)^2+(y+1)^2}$ K1 $PA=2PB$ N1 $3x^2+3y^2-44x+18y+75=0$	3	
(ii)	Subtitute x=0 into $3x^2+3y^2-44x+18y+75=0$ K1 K1 Use $b^2 4ac$ $(-6)^2-4(1)(25)$ =-44 $Not\ intercept\ y-axis$ N1	3	
			10

No.	Solution and Mark Scheme	Sub Marks	Total Marks
9*(a)*	$seen\ y-intercept = 4\ and\ x-intercept = -2$ P1 Integrate $\int(4-x^2)dx$ K1 $A_1 = 4x - \frac{x^3}{3}$ K1 Use limit $\int_{-2}^{0} into\ A_1$ $A_2 = \frac{1}{2}(2)(4)$ K1 K1 $*A_1 - *A_2$ N1 $\frac{4}{3}\ unit^2$	6	
(b)	Integrate $\pi\int(4-y)dy$ K1 $V_1 = 4y - \frac{y^2}{2}$ K1 Use limit $\int_{0}^{4} into\ A_1$ or $V_2 = \frac{1}{3}\pi(2)^2(4)$ $*V_1 - *V_2$ K1 N1 $\frac{3}{8}\pi\ unit^3$	4	
			10

No.	Solution and Mark Scheme	Sub Marks	Total Marks
10*(a)(i)*	$\dfrac{Use\ P(X=r)={}^{10}\square C_r(0.4)^r(0.6)^{n-r}}{P(X=0)={}^{10}\square C_0(0.4)^0(0.6)^{10}}$ K1 N1 0.00605	2	
(ii)	${}^{10}\square C_r(0.4)^r(0.6)^{10-r}$ K1 K1 $1-P(X=0)-P(X=1)$ or $P(X=2)+P(X=3)+P(X=4)+P(X=5)+P(X=6)+P(X=7)+P(X=8)+P(X=9)+P(X=10)$ 0.95364 N1	3	
(b)(i)	$z=\left(\dfrac{65-50}{8}\right)$ K1 N1 1.875	2	
(ii)	$z=\left(\dfrac{38-50}{8}\right)$ K1 K1 $Find\ P(-1.5\le z\le 1.875)$ and multiply 1200 1083 N1	3	
			10

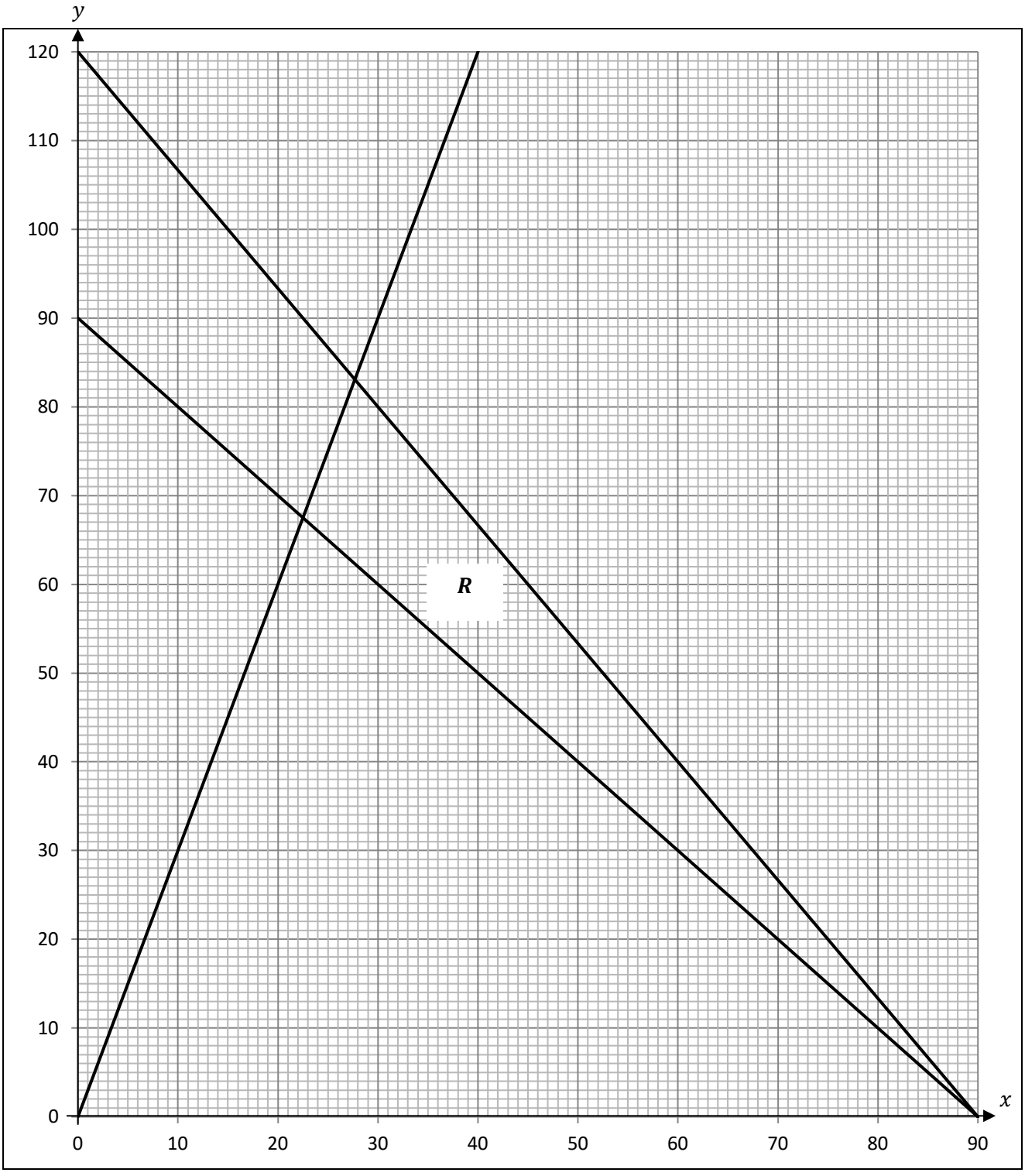
No.	Solution and Mark Scheme	Sub Marks	Total Marks
11*(a)*	$r + r + (r \times 1.571) = 17.85$ K1 N1 $5\ cm$	2	
(b)	$\sqrt{5^2 + 5^2}$ K1 N1 $7.07\ cm$	2	
(c)	$Find\ AD = 3.535$ P1 Find are DAFC K1 $A_1 = \frac{1}{2}(3.535)^2(\pi)$ Find area AOC K1 $A_2 = \frac{1}{2} \times 5 \times 5$ Find area OABC K1 $A_3 = \frac{1}{2}(5)^2\left(\frac{\pi}{2}\right)$ K1 $* A_1 + * A_2 - * A_3$ N1 $12.44\ cm^2$	6	
			10

No.	Solution and Mark Scheme	Sub Marks	Total Marks
12*(a)*	$\frac{1}{2}(10)^2 sin\angle RPS = 19$ K1 N1 $\angle RPS = 22.33^o$ $RS^2 = 10^2 + 10^2 - 2(10)(10)cos22.33°$ K1 N1 3.87 cm	4	
(b)	$Find\ PQ = 8.89$ K1 K1 $Find\ QS = 7.14$ $7.14^2 = 10^2 + 8.89^2 - 2(10)(8.89)cos\angle QPS$ K1 N1 $\angle QPS = 43.92^o$	4	
(c)	$\frac{1}{2}(10)(8.89)sin43.92°$ K1 N1 7.07 cm	2	
			10

No.	Solution and Mark Scheme	Sub Marks	Total Marks
13*(a)*	$2ms^{-1}$ N1	1	
(b)	Differentiate v and a=0 K1 $6t-7=0$ N1 $t=\frac{7}{6}saat$	2	
(c)	$V_{max}, a=0$ K1 K1 Subtitute $t=\frac{7}{6}\ into\ V$ $V=3\left(\frac{7}{6}\right)^2-7\left(\frac{7}{6}\right)+2$ $-\frac{25}{12}ms^{-1}$ N1	3	
(d)	Integrate $\int(3t^2-7t+2)dt$ K1 $s=t^3-\frac{7t^2}{2}+2t$ K1 Find $s_{t=*\frac{1}{3}}\ or\ s_{t=*2}$ $\left(s_{t=*\frac{1}{3}}\times 2\right)+\lvert s_{t=*2}\rvert$ K1 $s_{t=\frac{1}{3}}=\frac{7}{18}, s_{t=2}=-2$ N1 $\frac{25}{9}@2\frac{7}{9}$	4	
			10

No.	Solution and Mark Scheme	Sub Marks	Total Marks
14*(a)*	$x = 124.92$ N1 $y = 16.2$ N1 $z = 25$ N1	3	
(b)(i)	$(* 124.92 \times 35) + (125 \times 25) + (135 \times 20) + (116 \times 20)$ K1 $\bar{I} = \frac{(* 124.92 \times 35) + (125 \times 25) + (135 \times 20) + (116 \times 20)}{100}$ K1 125.172 N1	3	
(ii)	$\frac{RM28.30}{Cost\ 2014} \times 100 = 125.172$ K1 N1 $RM22.61$	2	
(c)	$\frac{125.172 \times 120}{100}$ K1 N1 150.21	2	
			10

No.	Solution and Mark Scheme	Sub Marks	Total Marks
15*(a)*	$x + y \geq 90$ N1 $4x + 3y \leq 360$ N1 $y \leq 3x$ N1	3	
(b)	Draw line correctly at least one straight line from *inequalitiea involving *x* only K1 N1 Draw correctly all the three *straight line Note: Accept dotted lines and solid line Region shaded correctly N1	3	
(c)(i)	*Find range of y from graph if* $x = 40$ K1 N1 $50 \leq y \leq 66$	2	
(ii)	*Subtitute any point in the* $*$ *shaded region into* $0.2x + 0.4y$ K1 $(28,82)$ N1 $RM38.40$	2	
			10


y
120
110
100
90
80
70
60
50
40
30
20
10
0
0
10
20
30
40
50
60
70
80
90
x
R